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THE

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OF

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VOLUME XXVI.

UNGULATA——WALES.

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UNGULATA, *Hoofed Mammals.* Under this section Linnæus included the orders *Belluæ* and *Pecora.*

The *Belluæ* comprised the genera *Equus* [Horse], Hippopotamus [River Horse], *Sus* [Suïdæ], and Rhinoceros. The *Pecora* consisted of the genera *Camelus* [Camel], *Moschus* [Moschidæ], *Cervus* [Deer], *Capra* [Goat], *Ovis* [Sheep], and *Bos* [Bison; Ox].

Elephas, the only true proboscidian genus noticed by Linnæus, is placed by him in the order *Bruta* and section Unguiculata, in company with *Bradypus* and *Myrmecophaga:* but *Elephas* and its congeners, both living and extinct, undoubtedly rather belong to the section of *Hoofed* than *Clawed* Mammals; and as far as their hoofs are concerned, to say nothing of their general pachydermatous structure, are more suited to the company of the Hippopotamus, Rhinoceros, and Tapir, than to that of Sloths [Ai; Unau], and Ant-Eaters.

Here must be noticed one of those interesting discoveries which we have now, thanks to the diligence of our functionaries in foreign lands, so often occasion to record.

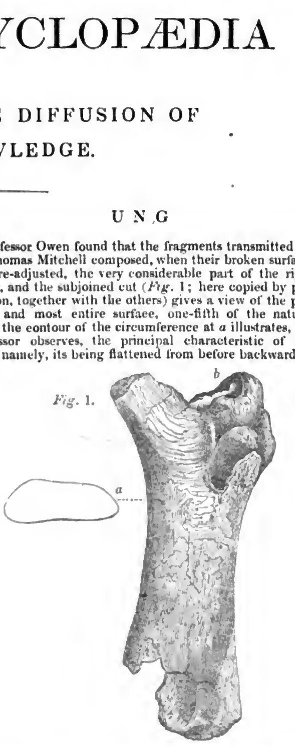
On the 1st November, 1842, Professor Owen communicated to the editors of the *Annals of Philosophy* the following intelligence:—

The Professor had received a letter, dated April 6, 1842, from Sir Thomas Livingstone Mitchell, surveyor-general of Australia, in which that active and zealous officer announced the discovery of large fossil Mammalian remains in that continent. The specimens from the Wellington Valley bone-caves, described in the second volume of Sir Thomas's work on Australia, and noticed in the article Marsupialia [vol. xiv., p. 468], were remains of extinct species of marsupial genera now existing there, and of a genus very nearly allied to those living in that locality at present: the largest fossil, which had been supposed to belong to a Hippopotamus or Dugong, indicating rather an extinct gigantic Phascolome; nor was there any conclusive evidence of a genus of placental mammal in that collection: Mr. Pentland however had informed Professor Owen that a bone of a large quadruped, apparently a pachyderm, from the Wellington Valley, is, as Mr. Pentland believes, in the museum at Paris. No account of this bone appears to have been hitherto communicated to the scientific world.

The fossils which Sir Thomas Mitchell transmitted incontestably establish the former existence of *Ungulata* in Australia, in the shape of, at least, one huge proboscidian Pachyderm, referrible, in Professor Owen's opinion, either to the genus Mastodon or Dinotherium. These fossils consist of a portion of a molar tooth, and of the shaft of a femur, with part of the spine of a scapula, and some smaller fragments of a long bone. They were found on the Darling Downs—those extensive plains marked to the south-west of Moreton Bay on most maps of Australia, at the source of the river Darling, and upwards of 4000 feet above the level of the sea: Sir Thomas, in his letter, also states that these huge bones are found in some abundance.

Professor Owen found that the fragments transmitted by Sir Thomas Mitchell composed, when their broken surfaces were re-adjusted, the very considerable part of the right femur, and the subjoined cut (*Fig.* 1; here copied by permission, together with the others) gives a view of the posterior and most entire surface, one-fifth of the natural size: the contour of the circumference at *a* illustrates, the Professor observes, the principal characteristic of the bone, namely, its being flattened from before backwards.

Fig. 1.



Part of the right femur of extinct Australian proboscidian Pachyderm.

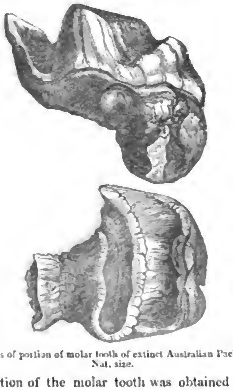
Professor Owen remarks that, with reference to the larger quadrupeds, the femur presents a similar antero-posterior compression in the elephant, mastodon, and rhinoceros; but the latter animal is distinguished by a second external trochanter, which is not present in the Australian fossil. [Rhinoceros, vol. xix., p. 465.] In the *Megatherium* and its congeners the flattening of the femur and its transverse breadth greatly surpass, he observes, the proportions exhibited by the fossil under consideration, or those of the femora of the proboscidian Pachyderms. [Elephant, vol. ix., pp. 349, 353.]

But the fossil from the Darling Range was found most to resemble the femur of the Mastodon (vol. xv., p. 5), in being flatter on the posterior than on the anterior surface. Compared with the femur of the *Mastodon giganteus*, the fossil presented the following differences; it was broader in proportion to its length:—

	Australian femur.		Mastodon.	
	In.	Lin.	In.	Lin.
From the lower part of the post-trochanterian depression to the prominence above the outer condyle	18	0	24	0
Breadth of middle of shaft of femur	5	0	5	9
Circumference of do. do. . .	13	6	14	6

The surface of the bone below the post-trochanterian depression *b* was more convex in the Australian fossil, and the prominence above the back part of the outer condyle was more developed; the small trochanter was narrower and longer, and defined by a groove along its anterior part. The femur in the *Mastodon giganteus*, observes Professor Owen, thins off almost to an edge at the outside of the distal half of the shaft: in the Australian fossil the corresponding part is broad and convex. The anterior part rises higher above the level of that part of the femur in the Australian fossil than in the Mastodon. The orifice of the medullary artery was conspicuous in the Australian fossil, at the back part, a little above the middle of the shaft, and towards the inner side; the canal sloping upwards. Professor Owen could not detect the corresponding orifice in the Mastodon's femur, with which he compared it. The Australian fossil exhibited a large medullary cavity along the middle of the shaft, with dense parietes an inch thick. Total length of the fossil twenty-two inches; greatest breadth across the upper or proximal end, where the neck begins to bend inwards, ten inches.

Traces of the smooth pitted surface at the broken distal end indicated the place of junction of the articular epiphysis, and prove that the entire shaft of the femur is, in this case, preserved: a part of the epiphysis was anchylosed to the shaft.



Two views of portion of molar tooth of extinct Australian Pachyderm. Nat. size.

The portion of the molar tooth was obtained from the same locality as the femur, and Professor Owen observes that if it belong, as is most probable, to the same animal, it proves that animal to be most nearly allied to *Dinotherium* and *Mastodon giganteus*, in which the grinding surface of the teeth is raised into broad, transverse ridges. Parts of two of the anterior ridges, and a smaller or lower one which runs across the base of the first, at the anterior part of the crown of the tooth, are preserved in the specimen. The apex of both the higher ridges has been worn by mastication, but not to the extent usually seen in the small deciduous molars of the Mastodons: there is less trace of a division of the summit of the ridge into mammillæ, the Professor observes, than would be presented by a similar-sized molar, equally worn down, of the *Mastodon giganteus*, in which the two mammillæ would be indicated by a median constriction. The transverse ridges, he remarks, are still more subdivided in the other known species, as *M. longirostris*, *M. latidens*, *M. angustidens*, or *M. elephantoides*: the Australian tooth he found to bear a greater resemblance to that of the *Dinotherium* in the simplicity of the transverse eminences; but he notices a deposit of cement, or *crusta petrosa*, at the bottom of the intervening valleys, which he had not observed in any Dinotherian molar.

Professor Owen refers to the additional proof of the close relationship of the Mastodon to the Dinotherium, derived from the discovery of the two tusks of the lower jaw in the young individuals of the Mastodon, and the retention of one of these as a sexual distinction of the male in *Mastodon giganteus*; and he is of opinion that the highly interesting member of the antient fauna of Australia revealed by the remains above described must be referred, on their evidence, to the same natural family of gigantic Pachyderms as that which includes the Mastodons and the Dinotheres, and to a species distinct from any yet determined; but he, wisely as we think, abstains from the imposition of any generic or specific name, until the requisite characters are obtained: these he has reason to expect will be forthcoming from specimens about to be collected by the energetic officer to whom zoologists are indebted for so many additions to the fossil fauna of New South Wales.

'The fossils above described,' says Professor Owen, in conclusion, 'will be presented, in the name of Sir T. L. Mitchell, to the Museum of the Royal College of Surgeons, London. They cannot be contemplated without suggesting many interesting reflections. They tell us plainly that the time was when Australia's arid plains were trodden by the hoofs of heavy Pachyderms; but could the land then have been, as now, parched by long-continued droughts, with dry river-courses, containing here and there a pond of water? All the facts and analogies which throw light on the habits of the extinct Mastodons and Dinotheres indicate these creatures to have been frequenters of marshes, swamps, or lakes. Other relations of land and sea than now characterise the southern hemisphere, a different condition of the surface of the land and of the meteoric influences governing the proportion and distribution of fresh-water on that surface, may therefore be conjectured to have prevailed when huge Mastodontoid Pachyderms constituted part of the quadruped population of Australia. May not the change from a more humid climate to the present particularly dry one have been the cause, or chief cause, of the extinction of such Pachyderms? Was not the antient *Terra Australis*, when so populated, of greater extent than the present insular continent? The mutual dependences between large mammalian quadrupeds and other members of the animal kingdom suggest other reflections in connection with the present fossil. If the extinct species ever so abounded as to require its redundancy to be suppressed by a carnivorous enemy, then some destructive species of this kind must have coexisted, of larger dimensions than the extinct *Dasyurus laniarius*, the antient destroyer of the now equally extinct gigantic Kangaroos, *Macropus Titan*, &c. whose remains were discovered in the bone-caves of Wellington Valley. Extremely few coprophagous beetles have hitherto, I believe, been found in Australia; and the scarcity of such is readily explained by the absence of native species of large herbivorous mammals; but the dung of the Mastodontoid quadrupeds which formerly existed in Australia must then have afforded the requisite conditions for a greater abundance of such *Coleoptera*. These and other speculations are naturally suggested by the highly interesting fossils here described. The great importance of such organic remains will be obvious from the few inferences which have been briefly noted; our obligations to the enlightened collector and transmitter of the Mastodontoid fossils are great, and the arrival of additional facts and specimens will be most earnestly welcomed.'

In conclusion, we would remark that *Mylodon* [UNAU] appears to be the singular link connecting the two great groups *Ungulata* and UNGUICULATA; for *Mylodon* has both hoofs and claws on the same foot.

UNICORN. 'Concerning the Unicorn, different opinions prevail among authors,' says the author of 'Thaumatographia Naturalis' (1633), and he adds that some doubt, others deny, and a third class affirm its existence.

Ctesias, the author probably whom Aristotle followed, describes the Wild Asses of India (ὄνοι ἄγριοι) as equal to the horse in size, and even larger, with white bodies, red heads, bluish eyes, and a horn on the forehead a cubit in length. For the space of two palms from the forehead this horn is entirely white, the middle part is black, and the extremity is red and pointed. Drinking-vessels are made of it, and those who use them are subject neither to convulsions, epilepsy, nor poison, provided that before taking the poison or after they drink from these cups water, wine, or any other liquor. After some other particulars, Ctesias describes these animals as very swift and very strong. When one of them begins to move, its pace is slow, but as it advances the pace increases, and it runs faster. Naturally these animals are not ferocious; but when they find themselves and their young surrounded by horsemen, they do not abandon their offspring, but defend themselves by striking with their horns, kicking and biting, and so slay many men and horses. The animal is also shot with arrows and brought down with darts; for it is impossible to take it alive. Its flesh is too bitter for food, but it is hunted for its horn and astragalus, which last Ctesias declares that he saw. (Ctesias, ed. Bähr, pp. 255, 329, 363.)

Aristotle notices the Indian Ass as a solipede which has a horn, and the only one of the solipedes possessing an astragalus. (*Hist. Anim.*, ii. 1.) He adds, in the third book, on the parts of animals, that those beasts which have only a single horn have it in the middle of their head; and evidently speaks of the Indian Ass from the accounts of others.

Herodotus (iv. 191) mentions asses (ὄνοι) having horns; and Strabo (xv., p. 1009, Oxford, folio) refers to Unicorn horses with the heads of deer.

Oppian (*Cyneget.*, ii., line 96) notices the Aonian bulls with undivided hoofs and a single median horn between their temples, whereas the Armenian bulls have two.

Cæsar (*De Bello Gallico*, vi., 26), when referring to the multitude of animals bred in the great Hercynian forest, speaks, probably from hearsay, of an ox with the figure of a deer, from the middle of whose forehead a single horn stands out higher and more direct than any horns known to him. He adds that from the top of this horn branches like palms are diffused, that the nature of the male and female is the same, and that the form and size of their horns are similar. He then notices the Elk.

Pliny, who, to be sure, places it in the company of the *Mantichora*, the *Catoblepas*, and the *Basilisk*, notices it as a very ferocious beast (asperrimam feram), similar in the rest of its body to a horse, with the head of a deer, the feet of an elephant, the tail of a boar, a deep bellowing voice (mugitu gravi), and a single black horn two cubits in length standing out in the middle of its forehead. He adds, 'Hanc feram vivam negant capi,' 'that it cannot be taken alive' (*Nat. Hist.*, viii. 21); and some such excuse may have been necessary in those days for not producing the living animal upon the arena of the amphitheatre.

Out of this passage most of the modern Unicorns have been described and figured. But let us pause to scan it. The body of the horse and the head of the deer appear to be but vague sketches: the feet of the elephant and the tail of a boar point at once to a pachydermatous animal; and the single black horn, allowing for a little exaggeration as to its length, well fits the two last-mentioned conditions, and will apply to one of the species of Rhinoceros.

Our limits will not permit us to follow out in detail the descriptions of the numerous writers who have treated of this subject, among whom are Ælian, Philostratus, and Solinus, Æneas Sylvius, Marco Polo, Gesner, Cardan, Garzias ab Horto, Andreas Marinus, Andreas Baccius, Bartholinus, Aldrovandus, Jonston, &c. Some however of the modern descriptions of the Unicorn may be excepted. Garcias noted down a description of this marvellous creature from one who alleged that he had seen it. The seer affirmed that it was endowed with a wonderful horn, which it would sometimes turn to the left and right, at others raise, and then again depress.* Ludovicus Vartomanus writes that he saw two sent to the Sultan from Ethiopia, and kept in a repository at Mahomet's tomb in Mecca, and he describes them as 'cancellis obseptos, minimè feroces.' Cardan describes the Unicorn as a rare animal, of the size of a horse, with hair very like unto that of a weasel, with the head of a deer, on which one horn grows, three cubits in length (a story seldom loses anything in its progress) from the forehead, ample at its lowest part and tapering to a point; with a short neck, a very thin mane, leaning to one side only, and legs thin as those of a young Roe (capreolus). But, not to weary the reader, if he wishes to see what our ancestors thought Unicorns like, let him turn to Jonston's 'Historia, Naturalis' (1657). There he will behold the smooth-horned Solipede, 'Wald Esel;' and the digitated and clawed smooth-horned 'Meer Wolff,' the latter with his single horn erect in the foreground, but with it depressed in the background, where he is represented regaling on serpents. Then there are the smooth-horned 'Monoceros, Unicornu, Einhorn,' with the head, mane, and tail of a horse, and bisulcate feet; and another smooth-horned 'Monoceros, Unicornu, Einhorn,' with a horse's head and mane, a pig's tail, and camel-like feet; the 'Meer Steinbock, Capricornus marinus,' with anterior bisulcate feet, posterior webbed feet, and a kind of graduated horn like a modern flat telescope opera-glass pulled out, in the foreground, and charging the fish most valiantly in the water in the distance; then there is the digitated 'Wald Esel, Onager Aldrovandi,' with a mule's head and two rhinoceros-like horns, one on his forehead and the other on his nose, and a horse's tail, with a collar round his neck; beneath we find the 'Monoceros, seu *Unicorna jubatus*—Einhorn mit mahnen,' with a neck entirely shaggy, a twisted horn, anterior bisulcate feet, the posterior being webbed, and a deer's tail; and at the bottom of the plate, 'Monoceros, seu Unicornu aliud—Einhorn mit mahnen, ein andr art,' with a twisted horn, mane, and shaggy gorget, curly tail, and camel-like feet.

The Unicorn seems to have been a sad puzzle to the hunters, who hardly knew how to come at so valuable a piece of game. Some, as we have seen, described the horn as moveable at the will of the animal, a kind of small sword in short, with which no hunter who was not exceedingly cunning in fence could have a chance. Others told the poor foresters that all its strength lay in its horn, and that when pressed by them it would throw itself from the pinnacle of the highest rocks horn foremost, so as to pitch upon it, and then quietly march off not a whit the worse.

But, it seems, they found out how to circumvent the poor unicorn at last. They discovered that it was fond of rarities, and particularly attached to chaste persons; so they took the field with a virgin, who was placed in the unsuspecting admirer's way. When the unicorn spied her, he approached with all reverence, couched beside her, and, laying his head in her lap, fell asleep. The treacherous virgin then gave a signal, and the hunters made in and captured the simple beast.

Modern zoologists, disgusted as they well may be with fables of which we have only given a specimen or two, disbelieve, generally, the existence of the Unicorn, such, at least, as we have above referred to; but the result of M. Guettard's dissertation is an opinion that some terrestrial animal bearing a horn on the anterior part of its head exists besides the Rhinoceros. The nearest approach to a horn in the middle of the forehead of any terrestrial mammiferous animal known to us is the bony protuberance on the forehead of the Giraffe; and, though it would be presumptuous to deny the existence of a one-horned quadruped other than the Rhinoceros, it may be safely stated that the insertion of a long and solid horn in the living forehead of a horselike or deer-like cranium is as near an impossibility as any thing can be.

The 'Monoceros horne' in Tradescant's collection was probably that which, ordinarily, has passed for the horn of the Unicorn, viz. the tooth of a Narwhal. The horn of the Rhinoceros has been supposed to possess the virtue of counteracting poison when made into drinking-cups. Old legends assert that the Unicorn, when he goes to drink, first dips his horn in the water to purify it, and that other beasts delay to quench their thirst till the Unicorn has thus sweetened the water. The Narwhal's tooth makes a capital twisted Unicorn's horn, as represented in the old figures. That in the repository of St. Denis, at Paris, was presented by Thevet, and was declared to have been given to him by the king of Monomotapa, who took him out to hunt Unicorns, which are frequent in that country. Some have thought that this horn is a carved elephant's tooth. There is one at Strasburg some seven or eight feet in length, and there are several in Venice.

Great medical virtues were attributed to the so-called horn, and the price it once bore outdoes everything except the Tulipomania. A Florentine physician has recorded that a pound of it (sixteen ounces) was sold in the shops for fifteen hundred and thirty-six crowns, when the same weight in gold would only have brought one hundred and forty-eight crowns.

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* Compare this with the account of the Ndzoo dsoo, in the article Rhinoceros, vol. xix., p. 473.

We have no satisfactory reason for believing that man ever coexisted with Mastodons; otherwise Professor Owen's discovery of the retention of a single tusk only by the male *Mastodon giganteus*, as a sexual distinction, might have afforded another form of Unicorn. [Rhinoceros; Whales.]

The Unicorn is a national symbol with us; for it is one of the supporters of the royal arms of Great Britain, in that posture termed by heralds 'saillant.'

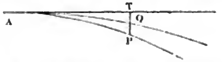
UNICUIRASSE'S, the French name for the *Unipeltata* or *Unicuirassed Stomapods*. [Stomapods, vol. xxiii., p. 82.]

UNIFORM. Though this word means nothing more than 'of one form,' it has a signification in mathematics which might be better rendered by 'of one value' or 'of one degree,' when we speak to the mathematical proficient. But it is a convenience, though only an accidental one, that the word does not imply the idea of value absolutely; a circumstance which may serve us to elucidate a point of great importance in the differential calculus. The commencement is made in the present article: the continuation will follow in Velocity.

In order to understand any application of mathematics, whether to space or matter, it is necessary that a perfect mathematical conception should be formed of the quality of space or matter which is to come under consideration. By a perfect mathematical conception, we mean that it must be distinctly seen, first, that the object under consideration is of the nature of magnitude; secondly, that it is of a measurable kind, that is, is capable of being measured, and can actually have a mode of measuring it assigned. Why do so many persons talk and write vaguely about force, velocity, density, acceleration, &c.? Simply because they are only conversant with the first consideration, and have no precision in their ideas of the second: they feel that they are speaking of magnitudes, of things which they know may be more or less, but they have not that familiarity with the precise way of ascertaining the *how much more* or the *how much less*, without which deduction cannot be made intelligible.

Now we say that in every instance in which measurement is shown to be attainable, there is a notion of uniformity which precedes, or ought to precede, that of mensurability; and that emphatic mention of this circumstance, and full development of its truth and meaning, ought to be the preliminary step to actual measurement. Moreover, we say that, inasmuch as this idea of uniformity is to be gained previously to that of measurement, we must forego the notion of 'uniform' and 'of one value' being convertible terms, and illustrate the word by considerations independent of value; for this last term implies measurement, as is easily seen.

If we were to take *velocity* as our instance, most readers would be able to appeal to ideas of measurement and value established in their minds, whether vaguely or precisely: we therefore prefer to choose *curvature*, a term which will be quite new as meaning a measurable magnitude to all except those who have more than an elementary knowledge of mathematics. Curvature is, as the name imports, the bending, the gradual bending, which distinguishes a curve from a straight line. It is a magnitude, that is, it allows of the application of the idea of more and less: one curve may bend more than another, or more in one place than in another. So much every one can be sure of at the first announcement: the next step would be to imagine it possible that one curve might, say at and about a point A, bend exactly twice as much as another at and about a point B. But here the ordinary reader can only imagine a possibility: no distinct criterion will at once present itself for determining what proportion the bendings or curvatures of two curves are to be stated as having to one another at two given points. If two tangents be drawn at the two given points, it is obvious that, according as the curve bends more or less, there will be more or less deflection from the tangent. Thus the curve AP, at the point A, has as much curvature as AQ, or more; certainly not less. Now as in other cases, if we measure curvature, it must be by curvature, as length by length, weight by weight, &c.; and as a preliminary, it will be desirable to have that curve which has everywhere the same curvature. This curve is obviously a circle, which is throughout its circumference bent in exactly the same manner. Those who cannot imagine how curvatures are to be measured can always see this much, that a true mode of measurement will give the same result to whatever point of a given circle it may be applied. A method of determining value must be false which gives at one point of the same circle a greater curvature than at another. Here we say that any one may see that a notion of uniformity has a useful existence previously to that of any mode of comparing the values of different cases of this uniformity. The circle A may have a radius twice as large as that of B: are we then to say that the curvature of B is double that of A? That the smaller circle bends most is certain; whence it is equally certain that curvature or bending is a magnitude: it has its more and less. Again, it is obvious that the circle B has the same curvature in all its parts, and that the circle A has the same; though the parts of A have a curvature which is not the same as that of the parts of B. Hence it is certain that uniformity of curvature is perfectly conceivable. Now what we have to enforce is, that all this takes place in the mind, before any mode can be given of answering the question how much the curvature of B exceeds that of A. The greater the radius the less the curvature, and A has twice as great a radius as B. If it be proper to say [Variation] that the curvature varies inversely as the radius, then B is twice as much curved as A; but if it be proper to say that the curvature varies inversely as the *square* of the radius, then that of B is four times as great as that of A. Here the object of this article ends, and we have referred to Velocity the manner of making the next step. At the risk of undue repetition, we state again, that a perfect idea of a magnitude, as a magnitude, and of its uniformity, or total absence of change of value, may exist in cases in which the accurate comparison of values, or measurement, is not attained, and may even exist in a mind which has not the means of conceiving the possibility of such comparison or measurement being accurately made.



UNIGENITUS, BULL. [Bulls, Papal.]

U'NIO. [Naiades; Unionidæ.]

UNION, IRISH AND SCOTCH. [Ireland; Scotland.]

UNIO'NIDÆ. Mr. Swainson makes the *Unionidæ* the first family of his third tribe (*Atrachia*) of his order '*Dithyra, Bivalve Shells*,' and thus defines and arranges it:—

Unionidæ. *River Mussels*, or *Unios*.

Animal fluviatile; shell solid, perlaceous; generally with cardinal and lateral teeth.

Subfam. 1. *Unioninæ*.

One valve, with two cardinal and two lateral teeth; cardinal teeth short; the umbones, or bosses, smooth or longitudinally undulated.

Genera:—*Unio*, Lam. (with the subgenera *Unio*, *Cunicula*, Sw., *Ligumia*, Sw., *Theliderma*, Sw., and *Megadomus*, Sw.).

Æglia, Sw. (with the subgenera *Æglia*, *Naidea*, Sw., and *Cathyria*, Sw.).

Mysca, Turton (with the subgenera *Potamida*, Sw., and *Lymnadea*, Sw.).

Subfam. 2. *Hyrianæ*.

Bosses longitudinally sulcated; cardinal teeth long, compressed, placed on one side of the bosses; hinge margin winged.

Genera:—*Iridea*, Sw.; *Castalia*, Lam. (with the subgenera *Naia*, Sw., and *Castalia*, Lam.); *Hyria*, Lam.; *Hyridella*, Sw.

Subfam. 3. *Iridininæ*.

Narrow and greatly elongated; hinge margin without teeth, but sometimes granulated.

Genera:—*Iridina*, Lam.; *Calliscapha*, Sw.; *Mycetopus*, D'Orb.

Subfam. 4. *Anodontinæ*.

Cardinal teeth none; lateral tooth extending along the hinge or entirely wanting; hinge margin generally winged.

Subgenera:—*Lamproscapha*, Sw.; *Symphynota*, Lea; *Anodon*, Lam.; *Hemiodon*, Sw.; and *Patularia*, Sw.

Subfam. 5. *Alasmodontinæ*.

Lateral teeth entirely wanting; cardinal teeth one or two.

Genera:—*Calceola*,* Sw.; *Alasmodon*, Say (with the subgenera *Uniopsis*, Sw., *Margaritana*, Schum., and *Complanaria*, Sw.). (*Malacology*.)

Mr. J. E. Gray makes the *Unionidæ* the eighth family of his order *Cladopoda*.

Genera:—*Anodon*, *Margaritana*, *Alasmodon*, *Damaris*, *Unio*, *Heterodon*, *Dipsas*, and *Monocondyla*.

The *Iridinidæ* form the ninth family of the same order in Mr. Gray's arrangement.

Genera:—*Iridina*, *Leila*, *Pleiodon*, *Hyria*, *Castalia*. (*Synopsis Brit. Mus.*) [NAIADES.]

UNIPELTA'TA, the Latin name for the UNICUIRASSÉS.

U'NISON, in Music, is a sound which is exactly the same as another, in regard to pitch, *i. e.* to acuteness or gravity.

Two or more strings agreeing in material, length, thickness, and tension are unisons, as instanced in the strings sounded by each hammer of a pianoforte. And two or more pipes, or tubes of any kind, being of the same dimensions, &c., are also in unison. But strings or pipes of very different materials, as shown in the instance of catgut and wire, of wood and metal, may be, and commonly are, *tuned* in unison. The organ of the human voice is a pipe, and probably governed by the same laws, so far as sound is concerned, as any other pneumatic instrument. Membranous surfaces, likewise, as drums of all kinds, and metallic bars, are equally obedient to the laws controlling all sonorous bodies.

UNIT or UNITY, the name given to that magnitude which is to be considered or reckoned as one, when other magnitudes of the same kind are to be measured. It is not itself *one*, but is the magnitude which *one* or 1 shall stand for in calculation: it is a length, or a weight, or a time, as the case may be, while 1 is only a numerical symbol. This symbol 1 represents the abstract conception of singleness, as distinguished from multitude, and is the unit of abstract arithmetic: but all concrete quantities must have units of their own kind.

Unity, says Euclid (book vii., def. 1), is that according to which each of existing things is called one: Μονάς ἐστι, καθ' ἣν ἕκαστον τῶν ὄντων ἓν λέγεται. And, allowing somewhat for idiom, it would not be easy to mend this definition. Anything may be unity, for other things of its own kind.

The common division of unities into abstract and concrete is merely the distinction between the unit of numeration and that of measurement: the former implying that reckoning or computation is to be performed, without specific reference to any particular object of reckoning; the latter, that some certain unit of length, of capacity, or whatever it may be, is to be signified by 1. On this point the learner must take pains to see, that of all the fundamental operations of arithmetic, three are wholly independent of this distinction, which cannot be said of the fourth. Addition, subtraction, and division can be physically performed, and without reference to units: two lines may be put together into one line, a line may be cut off from another, or a line may be carried along another time after time, until it is seen how many times the greater contains the less. But multiplication requires that number or magnitude should be taken a number of *times*, and the idea of multiplying a magnitude by a magnitude involves an absurdity. [MULTIPLICATION; RECTANGLE.] Nevertheless some enterprising writers on arithmetic profess to multiply magnitude by magnitude; and to make their doings more striking, they generally choose for their instance to multiply 99*l*. 19*s*. 11¾*d*. by 99*l*. 19*s*. 11¾*d*. To take an humbler case, let us examine the product of 5 shillings and 3 shillings: beginners educated in the common system of arithmetic are generally loth to part with the idea that this must be 15 shillings. The common rule of three, as generally stated, and given without proof, is the cause of much of the habit which leads to this unwillingness; and for those who cannot see any difference between 5 shillings taken 3 times, and 5 shillings multiplied by 3 shillings, the examination of a question in this rule will be worth while. Let it be as follows:—If 10 apples cost 7 pence, how much will 30 apples cost? The computer proceeds in this manner:—As 10 apples are to 7 pence, so are 30 apples to the answer required. According to the rule, he multiplies together 7 pence and 30 apples, and produces 210—of what he does not say. They can hardly be simple apples, or pence: probably they are 210 chemical compounds of an apple and a penny. The result is to be divided by the first term, 10 apples: here 210 divided by 10 gives 21, and the apples in the divisor decompose this compound, free it of all its fruit, and leave for the final answer 21 pence. The confusion which is caused by the improper use of the concrete unit can hardly be conceived by any but one who has been used to teaching.

UNITARIAN. This term, in its strict and literal interpretation, denotes simply a believer in one God; and, when thus understood, is a generic term, applicable to all Christians, for they all profess to receive the unity of the divine nature; and not only so, but to Jews and Mohammedans also, and even to those unbelievers commonly called Deists, who, on the grounds supplied by natural reason alone, admit the existence, providence, and moral government of one Supreme Being. But it is more commonly understood as opposed to Trinitarian, and is accordingly the received denomination of those Christians who acknowledge one God in one person, as distinguished from those who conceive of him in three persons, characters, or relations, each of which they regard as the proper object of a distinct and separate religious worship. The Unitarian Christian believes the Father to be the only true God, and Jesus his messenger to be the Christ. (*John* xvii. 3.) This is the leading fundamental principle, which constitutes the true and complete definition of the term; under which are consequently included all those who, receiving the divine authority or commission of Jesus Christ, believe him to be a dependent creature, deriving his existence from the Father, and therefore as the fit object of all the veneration, submission, and obedience which can be offered to a creature, but not of religious worship properly so called. Agreeing in this great and leading principle, Unitarians differ in their opinions as to the origin, nature, and dignity of the author of their religion. Some believe him to have been a celestial spirit of great power and dignity, existing before all worlds, and employed by the Father as his instrument or agent in the creation of the universe, or at least of this portion of it in which we dwell. These are usually called, and call themselves, Arians; though differing in various particulars from the distinguishing tenets of that celebrated heresiarch. Of this class was the late eminent Dr. Price, and many of the principal English Unitarians in the earlier part of the last century. Others believe Jesus to have had no existence previous to his birth, and to have been simply 'a man, approved of God by miracles and wonders and signs which God did by him.' (*Acts* ii. 22.) These are not unfrequently styled Socinians: but they themselves, almost universally, reject this appellation; both because it is usually given as a term of reproach (though in fact there is no more reason why it should be so considered than Lutheran, Calvinist, or Arminian), and also because Socinus held certain opinions which they disapprove, particularly the duty of praying to Christ, contrary, as many of them think, to his own express injunction (*John* xvi. 23); at all events, not authorized by any positive command or precept, and they allege that they can find no direction in the New Testament to pray to Christ; nor any example of prayer, properly so called, which is not addressed to 'the God and Father of our Lord Jesus Christ.' (*Eph*. i. 3, 17; iii. 14.) Unitarians believe that in Christ dwelt all the fulness of the Godhead, inasmuch as the spirit was not given by measure unto him, and as he was invested with full power to make known to the children of men the will and intentions of God concerning them; and they require no other evidence than his authority for receiving all which he delivered as coming from God. On this authority they believe that there will be a resurrection from the dead, both of the just and of the unjust, when all shall be rewarded according to their works, and when Christ himself shall come in the glory of his Father to judge the living and the dead. They believe that the truth of this declaration was ascertained and exemplified by his own resurrection from the grave. They believe that he was sent to include both Jew and Gentile in the terms of a new and better covenant; and to admit the whole race of mankind to a participation in the privileges of the family of God. For this reason it is that the death of Christ is described by himself as the blood of the new covenant, shed for many for the remission of sins; and hence Unitarians receive him not as God himself, but as the *image* of God (2 *Cor.* iv. 4), and a ray of his Father's glory—as the one Mediator between God and man.

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* N.B. This word is printed in Italics, the sign of a subgenus in Mr. Swainson's book.

Unitarians believe in the Atonement; understanding that term in the sense in which it is used in the only place where it occurs in the New Testament, namely, reconciliation. Men were enemies to God by wicked works; they were reconciled by the death of Christ, that is, by the new covenant of grace and mercy ratified by his death, in as far as they have been reclaimed from sin to a life of righteousness. In this sense they think that Christ died *for* us; not in our stead, but on our behalf; to procure for us the benefit of a new and better dispensation. Thus the terms or conditions of salvation are 'repentance towards God and faith in the Lord Jesus Christ.' And they deny that these views are liable to the charge which is sometimes brought against them, of underrating the evil of sin; considering that by repentance is meant not merely sorrow for past sin, but a change of mind and heart, leading to future amendment, and, when practicable, to restitution.

Unitarians are sometimes charged with relying upon their own merits, but erroneously. They profess to look for everything they have or can expect solely to the free grace and mercy of God, manifested in the gospel of Jesus Christ. This, and this alone, is the *procuring cause* of salvation, of which conversion where necessary, and repentance and better obedience in all cases, are only the prescribed, but indispensable condition; a condition, which they believe that all men are competent to fulfil, by a diligent and conscientious exercise of their natural powers. These powers, and the entire constitution which man inherits at his birth, they believe to be such as his Maker intended them to be, not less capable in their own nature of religious and moral improvement than those of his first progenitor, when cultivated with due care, exercised under an influential sense of the Divine presence, and an habitual application for the Divine protection and blessing promised in the Gospel of Jesus Christ.

Unitarians for the most part believe in the doctrine of Universal Restitution; considering punishment, both here and hereafter, not as the expression of what is called *vindictive* justice, but as the instrument of a remedial discipline, destined ultimately to bring back the sinner from the error of his ways. Others however are understood to believe in the final destruction of sinners. But it should be observed that on this, as on all other points, it is difficult to give any precise statement; because in fact there does not exist any Unitarian *creed* or standard, which the general body have ever formally recognised as of authority. No Unitarian will allow himself to be held responsible for the opinions maintained by any other, let his talents, eminence, or reputation be what they may. Thus, notwithstanding the respect in which they universally hold the names of Priestley and Belsham, they would protest against the attempt to charge them either collectively or individually even with all the theological opinions maintained by these eminent persons; still less would they choose to be considered as adopting implicitly all their peculiar tenets in metaphysics or philosophy.

Without touching on the controversies which have arisen respecting the history of Unitarianism in the primitive church, it may be sufficient for our purpose to observe that it quickly made its appearance among the leading reformers of the sixteenth century. The fate of Servetus, who was burnt at Geneva for the profession of this obnoxious sentiment, is the foulest blot on the character of Calvin. Several of the most eminent of the Italian reformers of that period were anti-Trinitarians of different degrees, some of whom became distinguished lights and founders of Unitarian churches in distant lands. In this country, during the reigns of Edward VI., Elizabeth, and James I., several persons expiated the offence of this form of heresy at the stake; but the first religious society established in England avowedly on this principle was gathered in the time of the Commonwealth by Biddle, who may therefore be styled the father of English Unitarianism. The Unitarians of the present day in this country are chiefly the descendants and representatives of that branch of the early Non-conformists who received the denomination of Presbyterians; and they are still known by that name, though no Presbyterian form of church-government, properly so called, has ever existed either among them or their predecessors. A smaller body are Baptists; and a few societies now Unitarian originally belonged wholly or partially to the Independent denomination. In the proper sense of the word they are all Congregationalists; inasmuch as every society is a distinct religious community, acknowledging no external control upon earth in spiritual concerns. In Ireland the Presbytery of Antrim, a considerable body who seceded from the Presbyterian church early in the last century, on refusing to subscribe the Confession of Faith, are wholly or chiefly Unitarian; and the same may be said of a still larger secession which has more recently taken place on a similar ground, forming what is now called the Remonstrant Synod. The first of these bodies consists of nine, the second of thirty congregations, most of them very numerous. There are also five Unitarian congregations connected with the southern Presbyterian synod of Munster. Flourishing Unitarian congregations have lately been formed in Edinburgh and Glasgow, and several smaller societies exist in other parts of Scotland.

The absolute number, either of congregations or of individuals forming what may be called the Unitarian body in Great Britain and Ireland, it is scarcely possible to estimate with any approach to accuracy. There exists no authority empowered to *exact* returns of this kind; and though inquiries have been made with the view of ascertaining this point, no precise result has been obtained. But it is thought the entire number would not be overrated at three hundred congregations, comprising upwards of one hundred thousand persons.

In the United States of America there are at least four distinct religious bodies who profess anti-Trinitarian opinions:—1. A large portion of the Congregationalist churches in Massachusetts, with a few in the adjoining states of New England, to which may be added churches of the same denomination in several of the principal towns in other parts of the Union. The strength of this denomination is understood to be at Boston and the neighbourhood: it numbers about 150 congregations. 2. The Universalists, whose leading tenet is the doctrine of Universal Restitution; but who have in general adopted some modification of Unitarianism. The churches of this sect are very numerous. 3. A considerable majority of the American Quakers, from whom their orthodox brethren have seceded of late years, and formed a distinct community. In the Epistle from the Yearly Meeting of Friends at Philadelphia, in 1831, their number was estimated at 43,000. 4. A numerous denomination who call themselves *Christians* by way of distinction, refusing to be enrolled as the followers of any other leader. They numbered some years since not fewer than seven or eight hundred congregations.

At Geneva, once the fountain-head and stronghold of Calvinism, the pulpits are mostly occupied by Unitarian preachers, and similar views are generally prevalent among the people. The same transition is said to have taken place in various parts of the adjacent canton of the Pays de Vaud.

In Transylvania the descendants of the followers of Socinus, Davides, and others, in the sixteenth century, still form a numerous community, estimated in 1839 at 47,000. They have a college at Klausenberg, containing about 100 students. We learn from a late traveller that they are said to be distinguished for their prudence and moderation in politics, their industry and morality in private life, and the superiority of their education to the generality of those of their own class. (Paget's *Hungary and Transylvania*.)

In this article no attempt has been made to exhibit the Scriptural proofs on which Unitarians are accustomed to rely; still less to give any minute critical examination of the texts usually cited in opposition to their doctrines; but merely to state as concisely and distinctly as possible what those doctrines are. Those who wish to obtain further information on this subject are referred (among other sources) to Lindsey's *Apology* and *Sequel*; Lardner's *Letter on the Logos*; Belsham's *Calm Inquiry*; Carpenter's *Unitarianism the Doctrine of the Gospel*; Yates's *Replies to Wardlaw*; and the Doctrinal Discourses of the late Dr. Channing.

UNITED BRETHREN. [Moravians.]

UNITED PROVINCES *of the Netherlands.* [Netherlands.]

UNITED STATES OF NORTH AMERICA. The geography, statistics, and local history of each state have been given apart. The object of this article is to trace the process by which the United States became a nation, and to describe briefly the extent of their territory, their population and its character, and the organization of their general government.

History.—The peace of Paris, concluded in 1763, broke the strongest link of the chain which kept the American plantations subject to England. The hostilities between the French and English colonists in North America, which commenced in 1613, and were only interrupted by brief intervals of truce till 1763, obliged the English settlers to acquiesce in the sovereignty of the mother-country, in order to insure its protection. When, by the peace of Paris, Canada was ceded to England, and the settlements of France confined to the town of New Orleans and a few plantations on the Mississippi (which were soon after ceded to Spain) one of the most powerful motives which induced the Colonies to continue subject to the British government ceased to exist.

In 1763 the British colonies were in number thirteen: Virginia, the oldest, having been founded in 1607; Georgia, the newest settlement, in 1732. It is impossible to say with precision what was at that time the amount of their population. In 1749 it was estimated that the inhabitants of the colonies amounted to 1,046,000 souls. The increase in the towns of Boston, New York, and Philadelphia during the interval between that year and 1763, appears to have been about 20 per cent.; and from the amount of new lands taken into cultivation, the general increase cannot have been at a lower ratio, which would give the population in 1763, at 1,216,000, probably an under estimate. The value of the produce exported to Great Britain in 1750 was 804,770*l.* 5*s.* 6*d.*; of the goods imported from that country in the same year, 1,313,076*l.* 1*s.* 11*d.* The value of the goods exported in 1760 was 761,101*l.* 11*s.* 6*d.*; of those imported, 2,611,766*l.* 16*s.* 10*d.* The falling off in the exports is accounted for by the war then raging; the increase of the imports, by the remittance of warlike stores and goods as a means of paying the regular army in America. This disturbance renders it impossible to make use of the export and import tables to check the estimate of the population.

The settlers in the British colonies of North America were scattered in a straggling line, along the sea-board, from the 31st to the 44th degree of North latitude. Albany was the western termination of the settled country in the north; the Blue Ridge, in Virginia; in the Carolinas and Georgia the breadth of the settled countries from the sea was still less. The varied circumstances under which the colonies had been originally planted, and the difficulty of intercourse between those which were at a distance from each other, had promoted a striking diversity of provincial character.

In Virginia, founded by adventurers who sought only to better their fortunes, and augmented during the civil wars of England by the resort of royalist refugees, the opinions and sentiments of the population differed from those which prevailed in England only through accidents of local position. Subsequently to the year 1670 the labour of negro slaves had superseded throughout the colony the compulsory labour of indentured white servants or convicts. The settlers were dispersed through the colony, along the banks of the navigable rivers. They were all agriculturists, engaged in the growth of tobacco, the staple of the colony. Many of the landed estates were large and entailed. The richest planters cultivated their own lands, with their own slaves, and consumed great part of the produce in the exercise of a profuse hospitality. They received in return for their tobacco articles of foreign luxury, but most of the estates were deeply in debt to the English or Scotch merchants, who carried on the commerce of the province. The Church of England was established, and gave the law in religion and morals, though dissenters were numerous. Literature was neglected; and, in the absence of intellectual pursuits, and of the elegant dissipation of cities, the leisure of the wealthier classes was saved from ennui by field-sports, cock-fighting, gaming, and drinking. It is among men of this kind that the military character is most apt to develop itself; and accordingly we find the provincial troops of Virginia, during the war which ended in 1763, not only more numerous, but better organized and disciplined, and producing more officers of talent than those of any other colony. The general character of Maryland society differed in no essential particulars from that of Virginia. The social tone of the Carolinas and Georgia differed from both only in a more close connection with the mother country, owing perhaps to their comparatively recent establishment, and the prevalent practice of sending young men of fortune to be educated in England.

The inhabitants of the New England provinces, the next settlements in point of antiquity to Virginia, differed materially from the societies which have just been passed in review. The first settlers were driven to America by religious and political motives: they came to organize a civil society in accordance with their theoretical views, which were Puritan in religion, and republican in politics. There was a more scanty admixture of the aristocratical families of England among them than among the southern settlers. Their less productive soil and less favourable climate forced upon them habits of more unremitting industry than prevailed in the south, and rewarded them rarely with more than a competency in return. The fisheries and the infant manufactures of these countries promoted a less straggling mode of settlement than prevailed in Virginia, and the development of greater energy, versatility, and promptitude in action. Their sectarian and propagandist turn of mind was favourable to a certain range of study; and scientific education, as far as it could be rendered subservient to worldly advantages or polemical superiority, was zealously patronised. The New Englanders were the politicians of the English colonies in North America.

The midland colonies, from the western boundary of Connecticut to Maryland, were peculiarly circumstanced. That region had been originally colonised by the Dutch and the Swedes, and the bulk of the original settlers remained in the country after it had been ceded to Great Britain. Their numbers were occasionally reinforced by fresh emigrants from Holland and Sweden, and a considerable number of Germans joined them. Except in the town of New York, the Dutch population predominated throughout the country till a short time before the revolutionary war. The favourable commercial position of New York rendered it at an early period the great emporium of British America; and this circumstance, cooperating with the non-amalgamation of the Dutch and English settlers, kept the citizens of New York less decidedly American than any of the other colonists. They were neither zealous provincial politicians, like the New Englanders, nor attached to the soil, like the planters of Virginia: they were merely wealthy traders. The important part taken by the Society of Friends in the settlement of Pennsylvania, another of the central conquered provinces, had also tended to give it a more neutral and undecided character than either the southern or northern group of provinces. Quaker principles are a system of negations; no society could be maintained upon them; and accordingly the management of provincial business fell into the hands of those who qualified the doctrines of the sect, of those who left it altogether, and of immigrants who never had belonged to it. But the proprietary hold upon the province, vested in the family of Penn, in a great measure neutralised the working of these elements down to the period of the Revolution. There was personal industry and affluence in Pennsylvania, a decent attention to intellectual pursuits, but little public spirit; neither the military ardour of Virginia nor the political enthusiasm of New England. This systematic quietude was more respectable than the mercantile Epicureanism of New York; but their consequences did not differ widely.

The institutions of all these colonies were calculated to develop both the taste and talent for political business. In all new settlements it is found expedient to task private individuals with the discharge of functions which in more matured societies devolve upon professional men. The range of jurisdiction intrusted to justices of the peace was necessarily much wider in the colonies than in the mother country; the licence to practice as legal agents was more easily obtained. In all the colonies, elective assemblies participated largely in the legislative and financial authority. An organized militia was required for defence against the aggressions of the Indians and French settlers. Under the influence of these circumstances, a class of professional public men had grown up in the colonies: men indisposed by their tastes, or incapacitated by their want of powers of continuous industry, for trade or agriculture, devoted themselves to public business, not merely as amateurs, but as a means of gaining a living, and sometimes affluence and power. The narrow sphere in which they acted heaped a number of incongruous employments upon them: they were in general a strange mixture of the lawyer, politician, and soldier, not entirely secluded from mercantile and agricultural pursuits.

The almost incessant wars between France and England had developed more comprehensive views and more ambitious aspirings among these men than could find sustenance in the petty domestic business of one colony. The remoteness of the central government not unfrequently rendered it necessary for the local authorities to take measures which, in strict propriety, could only originate with it, and employ the nearest and readiest agents in carrying them into execution. Undertakings too were at times found necessary which surpassed the powers of a single colony, and for which the combined efforts of several were required. Cases of this kind are numerous, but belong properly to the history of individual colonies: the enterprise however which led to the capture of Louisbourg, in 1745, as the first in a train of operations which led to a gradually extending federation of the colonies, belongs to their common history.

From 1730, when the resolution of the French government to unite its settlements in Louisiana and Canada by a chain of posts along the Mississippi and the lakes became apparent, every movement of that power had been jealously watched by the English. In that year a treaty was concluded with the Cherokees south and west of Carolina, in which they acknowledged themselves the subjects of King George. The province of New York, apprehending an invasion from the Indians under French influence, voted, in 1734, 6000*l.* for fortifying the city of New York; 4000*l.* for erecting a stone fort and other conveniences for soldiers at Albany; 800*l.* for a fort and blockhouse at Schenectady; and 500*l.* for managing the Senecas, and, if possible, constructing military posts in their territories. In 1744 war was declared by Great Britain against France; and before the intelligence reached New England, the governor of Cape Breton sent 900 soldiers under Duvivier against Canso, which they surprised and took. As a measure of retaliation, and also as a measure of security against French privateers, it was deemed by the English a measure of high importance to reduce Louisbourg, a strong fortified town, erected by the French on Cape Breton. Shirley, governor of Massachusetts, proposed the enterprise to the members of the general court, without waiting for authority from England. The proposal was agreed to by a majority of only one vote, and circulars despatched to the other colonies, as far as Pennsylvania, requesting assistance: all excused themselves from taking part in the adventure, except Connecticut, New Hampshire, and Rhode Island. Forces were raised, and a small navy equipped. Massachusetts sent 3250 men, New Hampshire 304, Connecticut 516, Rhode Island 300 (who arrived too late): these were commanded by native officers. Connecticut and Rhode Island consented that their colony sloops should be employed as cruisers; Massachusetts hired a privateer of 200 tons, and a snow of less burden; Boston fitted out a ship and a snow; the governor added a ship of 20 guns, a snow, a brig, and three sloops: this squadron was placed under Captain Tyng as commodore. The armament was joined off Canso by Commodore Warren from England, with one ship of 60 guns and three of 40 guns each. Louisbourg and a number of rich French vessels were taken by Warren and the provincial forces. The Assembly of Pennsylvania, which had refused to participate in the expedition, on hearing that Louisbourg was taken, voted 4000*l.* for the maintenance of the troops.

The success of this enterprise emboldened Shirley to project the conquest of all the French dominions in America. The British ministry approved of the scheme, and a circular was sent by the secretary of state to the governors of Virginia and all the colonies to the northward, requiring them to raise as many men as they could spare, and form them into companies of 100, to be ready to support the naval and land forces to be sent from England. The colonial assemblies voted, in 1746, very unequal proportions of men:—New Hampshire, 500; Massachusetts, 3500; Rhode Island, 300; Connecticut, 1000; New York, 1600; New Jersey, 500; Maryland, 300; Virginia, 100; Pennsylvania, 400: in all, 8200. But the English troops and general, or even orders from England, were expected in vain the whole summer. As autumn approached, Shirley and Warren resolved, rather than allow the whole year to pass in inaction, to assemble a sufficient force of provincials at Albany, and with it make an attempt upon the French fort at Crown Point. Before this could be effected, movements among the French and Indians along the north frontier of New England. and the arrival of a powerful fleet, with 4000 soldiers and military stores, from France, turned all their attention to the defensive operations. In a few days 6400 of the inland militia marched into Boston; 6000 held themselves in momentary readiness to march from Connecticut; old forts were repaired, and new ones erected. A succession of storms, in which the French fleet sustained much loss, and a pestilential fever, which broke out among the French troops, averted the danger. The colonists felt that the mother country had left them to carry on its war with their own unaided resources. No other operations of moment were undertaken in America till a treaty was concluded between Great Britain and France in 1748.

The treaty produced no peace, but only a hollow truce, during which both parties were digesting and maturing more extensive plans of war. There were also desultory hostilities carried on along the whole frontier, and the North American colonies, both of France and England, were all frontier. The military organization of New England and New York was kept up. Even in Pennsylvania the sense of the necessity of a defensive establishment, and the dexterous management of Franklin, had introduced a respectably disciplined militia, erected forts, and procured cannon. In 1751 Virginia was divided into military districts, and an officer, called adjutant-general, with the rank of major, appointed in each, whose duty it was to assemble and exercise the militia, inspect their arms, and enforce the discipline prescribed by the laws. When Governor Dinwiddie arrived in Virginia, in 1752, he portioned out the colony into four military divisions, and George Washington, who had been chosen one of the adjutants-general, had his commission as major renewed, and was appointed to command the northern division.

In 1753 the French crossed the Ohio in force, and entrenched themselves on the upper waters of the Ohio. This fact being reported by Washington, who had been sent on an exploratory mission by Dinwiddie, a small force was called out to watch the frontier, and placed under the command of Washington, who established his headquarters at Alexandria. Orders from England had by this time reached the governors of all the colonies, instructing them, in the event of encroachments on the part of the French, to repel force by force, and recommending union for defence. In compliance with this recommendation, a general convention of delegates from all the colonies was summoned for the purpose of holding a conference with the chiefs of the Indian tribes north of New York, called the Six Nations. The convention met at Albany, on the 14th June, 1754: it was composed of delegates from New Hampshire, Massachusetts, Rhode Island, Connecticut, Pennsylvania, and Maryland, with the lieutenant-governor and council of New York, and it was met by 150 men of the Six Nations. This assembly constitutes an epoch in the history of the United States: a plan was presented to it for a permanent union of all the colonies under one government, so far as might be necessary for defence and other important general purposes.

Several of the commissioners came prepared with plans for a union of the colonies to be submitted to the congress. A vote was taken whether a union should be established, which passed unanimously in the affirmative; a committee was then appointed, of one from each colony, to report on the different plans, and that which had been drawn up by Franklin was preferred, and with a few amendments reported. Franklin's proposal was, that application should be made for an Act of Parliament to include all the British colonies in North America within one government, under which each colony might retain its own constitution; that this general government should be administered by a president-general, appointed and supported by the crown, and a council nominated by the legislative assemblies of the different colonies; that the general government should have the power to purchase Indian lands for the crown, to make new settlements on those lands, to make laws for the new settlements till the crown should form them into particular governments, to raise and pay soldiers, build forts and equip vessels for the defence of the colonies, to make peace or declare war with the Indians, to regulate the Indian trade, to levy duties for these purposes, and to appoint a treasurer. After lengthened debates this plan was agreed to, and copies ordered to be transmitted to the board of trade and the assemblies of the several provinces. The board of trade disapproved of it as too democratic, the assemblies as too favourable to prerogative. That such a plan should be proposed was, however, an indication of the direction which the minds of the American leaders had taken, and its discussion in the provincial assemblies riveted men's minds upon a tangible and practical measure of union. It formed public opinion; for, with the exception of an elective president, it embodies all the essential features of the constitution ultimately adopted by the United States.

The British ministers devised a scheme of their own, whereby the governors of the provinces, with some members of their respective councils, were to meet and make arrangements for the common defence; they were to draw on the treasury of Great Britain for the expense, which was afterwards to be refunded by a tax levied in America by act of parliament. No immediate arrangements were made for realizing this project; but in the meantime General Braddock was sent to America with two regiments of regular troops. His progress towards the frontier was arrested in Maryland for want of carriages, no commissariat arrangements having been made either by the British or colonial governments. Out of this dilemma the general was extricated by the practical genius of Franklin. Braddock advanced, utterly regardless of the advice of the colonists familiar with Indian warfare, and led the advanced division of his army into an ambuscade, where it was entirely defeated. Dunbar, who commanded the second division, fled precipitately to Philadelphia. Washington distinguished himself in covering the retreat of the routed party, and subsequently in protecting the Virginian frontier. The Assembly of Philadelphia raised 60,000*l*. to place their frontier in a state of defence; and the erection of forts and the calling out and organizing the militia was intrusted to Franklin. In the meantime the provincial forces of the New England provinces had struggled against the French with varying fortune between Albany and Fort George: their campaign ended with both parties retiring within their respective frontiers and strengthening their forts. The result of the military operations of the year was alarming to the British settlers, but a more lasting impression produced in their minds was, that it would have been still more disastrous had their defence been intrusted to British troops entirely, instead of being left mainly to their own exertions.

Though hostilities had been carrying on in America in 1754 and 1755, war was not formally declared between Britain and France till 1756. In that year extensive armaments were sent to America by both governments, and the provincial regiments acted throughout the remainder of the war as auxiliaries. They continued to form a majority of the British forces, but their officers were kept in a subordinate condition extremely galling to those among them who had acquired military experience in the frontier wars, in the expedition of Vernon against Carthagena, and on other occasions. The rest of the war therefore, as affording no further indications of the growth of a spirit of nationality among the Anglo-Americans, may be passed over with the intimation that it was ended in 1763 with the cession of Canada to Great Britain by France.

Immediately after the ratification of the treaty of peace, the intention of the British ministers to quarter troops in America and support them by taxes levied on the colonies was announced. On the 10th of March, 1764, the House of Commons adopted a resolution, 'that it was proper to charge certain stamp-duties in the colonies and plantations.' And on the 5th of April an act was passed granting certain duties in the colonies. This act was in substance only a renewal of the Sugar Act of George II., but instead of the reason (commercial regulations) assigned in the preamble of the old statute, the new was avowedly intended for the raising of revenue. Instructions were at the same time given by the British government to the commanders of king's ships stationed in America to enforce the law against smuggling. The conduct of the British ministers was indicative of infatuation. Events had impressed the colonists with the opinion (whether correct or otherwise is indifferent) that with proper organization they were competent to defend themselves even when threatened by the vicinity of French settlements; and now it was proposed to quarter soldiers upon them, when that danger had been removed. Again, restrictions upon their trade had always been a grievance with the colonists. The Navigation Act, passed in 1651, and reenacted in 1660, had always been laxly enforced in America. The New Englanders carried their fish to the Mediterranean and brought back the produce of Southern Europe in exchange; Spain was the best market for the rice of Carolina; the Dutch settlers of New York kept up without scruple their commercial intercourse with their parent country. 'It has been a maxim with me during my administration,' said Sir Robert Walpole in 1739, 'to encourage the trade of the American colonies in the utmost latitude. Nay, it has been necessary to pass over some irregularities in their trade with Europe; for by encouraging them to an extensive growing commerce, if they gain 500,000*l*., I am convinced that in two years afterwards full 250,000*l*. of their gains will be in his majesty's exchequer by the labour and product of this kingdom; as immense quantities of every kind go thither; and as they increase in their foreign American trade more of our produce will be wanted.' But this leniency was perhaps more unwise than a rigorous enforcement of the navigation laws; being generally left in abeyance, any attempt to enforce them was in appearance (perhaps in reality) a resuscitation of obsolete laws for purely vexatious purposes. One of the occasional attempts to enforce them in Boston having led to the issuing of 'writs of assistance' to aid custom-house officers in the discharge of their duty, according to the usage of the exchequer in England, gave occasion to challenge the legality of these writs in the provincial Superior Court of Justice. Mr. Otis, at that time advocate-general, was requested by the government to argue in support of the writs: he refused, resigned his office, and appeared as counsel for the people to plead against them. The decision of the court was, that it 'could see no foundation for such a writ;' but this was the least effect of Otis's argument. In the course of it he, in the words of President Adams's summary of his speech, 'examined the acts of trade one by one, and demonstrated that if they were considered as revenue laws, they destroyed all our security of property, liberty, and life, every right of nature and the English constitution, and the charter of the province.' This was the theme that arrested the attention of the public and dwelt in their recollection. 'I do say,' wrote Adams, long after, 'that Mr. Otis's oration against writs of assistance breathed into this nation the breath of life.'

The enactments of 1764 were met in the spirit which Otis had inspired. The Assembly of Massachusetts protested against the Sugar Act and the quartering of troops as unconstitutional; and appointed a committee to sit during the recess, to write to other governments to inform them of the resolutions, and to invite all the colonial assemblies to join with them to obtain a repeal of the Sugar Act and prevent the enactment of a Stamp Act. In Virginia, the House of Burgesses, on receiving information of the declaratory act, prepared an address to the king, a memorial to the House of Lords, and a remonstrance to the House of Commons. The confiscations of the naval commanders put a stop to the commerce which the English colonies had carried on with the French islands and the Spanish settlements. The consequence of these acts and discussions was a universal ferment throughout the colonies; nevertheless the Sugar Act, being regarded as a commercial regulation, was not openly disobeyed.

In the beginning of 1765 the British parliament followed up the declaratory resolution of the preceding year by passing an act for raising a revenue by a general stamp-duty through all the American colonies. The Assemblies of Massachusetts and Virginia protested against the act as unconstitutional. On the 7th of October a congress, consisting of twenty-eight delegates, from the Assemblies of

Massachusetts, Rhode Island and Providence Plantations, Connecticut, New York, New Jersey, Pennsylvania, the Delaware counties, Maryland, and South Carolina, met in the city of New York. The results of its deliberations were, a petition to the king, a memorial to each house of parliament, and a recommendation to the colonies to appoint special agents to solicit redress of grievances. Besides the new measures, almost every colony was at that time complaining of some particular grievance, some of them of long standing: the Stamp Act had the effect of making each colony adopt all the grievances of its neighbours as its own. The Stamp Act was never enforced: in every town local mobs obliged those who had been nominated collectors and distributors under it to decline the employment. In 1766 the Stamp Act was repealed by parliament; but the repeal was accompanied by a declaratory act, asserting the right and power of the British legislature to bind the colonies in all cases whatever. In conformity with this declaration an act was passed in 1767, imposing a duty on paper, glass, painters' colours, and teas, to be paid by the colonists in the colonies. This act was met on the part of the Americans with the same determined spirit of resistance as the Stamp Act. The Assembly of Massachusetts addressed, in February, 1768, a circular letter to the burgesses and representatives of the people throughout the colonies, requesting them to unite to obtain redress. In April of the same year the British minister transmitted a circular letter to the governors, instructing them to use their influence to defeat the attempt to combine the colonies, by prevailing upon the Assemblies of their respective provinces to take no notice of the Massachusetts letter. The colonial legislatures refused to give any promise to that effect, and were dissolved. The members of the Massachusetts Assembly, on being dissolved by the governor, re-assembled under the name of a convention, and continued to sit and act as a legislature in defiance of his authority. When the new colonial legislatures met, in 1769, they proved as intractable as their predecessors. In 1770 Lord North, who had succeeded the duke of Grafton as premier, prepared a bill to repeal as much of the act of 1767 as imposed duties on glass, paper, and painters' colours, and to continue that part which imposed a duty on tea. Such a trifling alteration could have no effect on the sentiments of the Americans: they objected to the British parliament's right to tax them, not to the amount of the tax; and were not to be conciliated by a remission of duties repealed, to use Lord North's own words, 'because they had been found unproductive.'

From the meeting of the Congress of 1765 till 1774, there was little appearance of concert among the colonies in their opposition to the parliamentary measures of the mother-country. The government of Great Britain could enforce none of its mandates throughout the thirteen colonies, except where its soldiers were present to enforce them. But the resistance was everywhere local, spontaneous, unpreconcerted. Each colony, each assembly, each township, each man, resisted in their individual or corporate capacities, but without any appearance of previous arrangement or ulterior object. This desultory struggle had the effect of making the opposition a personal concern of every one engaged in it. An emulative spirit made every man or corporation seek to outdo his or its fellows in boldness. In 1771 the Regulators of North Carolina shut up the courts of justice, and were only put down after a pitched battle. In 1772 the colonists of Rhode Island captured the armed government schooner Gaspee. In 1773 the citizens of Boston threw the cargoes of tea, which had been brought into their harbour notwithstanding their non-importation resolutions, into the sea. Every attempt on the part of the government officers to enforce the obnoxious laws called forth petitions, protests, and remonstrances from the colonial legislatures; and when these bodies were dissolved, their members met as congresses or conventions without the authority of the governors, and transacted business as before. Every collision between the British soldiery and the colonists gave occasion to public meetings, in which the popular wrath was stimulated by glowing declamation. This chaotic period of agitation is one which precedes all social revolutions: it is giving popular leaders too much credit for inventive genius and foresight to say they occasion it; at best they can only use it. But the popular leaders in America were not slack in their efforts to give form and organization to this spontaneous movement. Soldiers had been quartered upon Boston so early as 1768, under the impression that its citizens were the originators of the disaffection, of which they were only the boldest utterers. The destruction of the tea in that town in 1773 was punished in 1774 by an act of parliament ordering the port to be shut up. The enforcement of this act converted the community of Boston into martyrs for American liberty. At Philadelphia a subscription was set on foot for the poorer inhabitants: the Assembly of Virginia proclaimed a solemn fast to be observed on the day the port was closed: the neighbouring ports offered the use of their stores and wharfs to the merchants of Boston. Boston became a central point towards which the sympathies of all America converged—the nucleus of a combination of all the colonies. Committees of correspondence already existed in most of them. The first had been appointed at a town meeting in Boston, in 1772; another by the House of Burgesses of Virginia, in 1773. In June, 1774, the Massachusetts House of Representatives appointed a committee of five persons to meet committees or delegates from the other provinces at Philadelphia on the 1st of September; and by the agency of the committees of correspondence it was brought to pass that delegates from eleven colonies appeared at Philadelphia on the 4th of the month named. The colonies represented were—New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and Virginia. On the 14th the deputies from North Carolina arrived. This first Continental Congress continued to sit for eight weeks. During that period it prepared and published—1, A Declaration of Rights, enumerating the acts by which they had been violated, and declaring a repeal of these acts indispensable to the restoration of harmony between Great Britain and the colonies. 2, A loyal address to the king. 3, An address to the people of Great Britain. 4, Letters to the people of Canada, to the colonies of St. John's, Nova Scotia, and Georgia, and the Floridas, inviting them to unite in the common cause of British America. 5, A memorial to the people of British America, stating the necessity of a firm observance of the measures recommended by Congress, as they valued the rights derived from their constitution.

Having transacted this business, Congress dissolved, but not without expressing an opinion 'that another congress should be held on the 10th of May next ensuing,' at Philadelphia, unless the redress of their grievances should be previously obtained;' and recommending 'to all the colonies to choose deputies as soon as possible, to be ready to attend at that time and place, should events make their meeting necessary.' The resolutions of the Continental Congress received the sanction of the thirteen provincial congresses and colonial assemblies, with the exception of that of New York: that town, as the head-quarters of the British army, and animated by the mere spirit of trade, was more lukewarm than the rest of the country.

The assembling of the first Continental Congress was a realization of the plan of union proposed by Franklin twenty years before. This became more apparent in 1775. The second Congress met at Philadelphia on the 10th of May, but before that time hostilities had been commenced by the battle of Lexington in Massachusetts. The intimation of this collision to Congress called forth a declaration that hostilities had already commenced, and that the colonies ought to be placed in a state of defence. On the 27th of May it was voted that 20,000 men should be immediately equipped, and George Washington appointed general and commander-in-chief; articles of war were framed, and the organization of the higher departments of the army commenced; and, most decisive step of all, bills of credit were issued to the amount of three millions of milled Spanish dollars, to defray the expenses of the war, and 'the Twelve United Colonies' pledged for their redemption. On the 25th of July it was voted that additional bills, to the value of another million, should be struck, and that a force not exceeding 5000 should be kept up in the New York department. On the 26th, that a postmaster-general be appointed for the United Colonies, and a line of posts established under his direction from Falmouth in New England to Savannah in Georgia. On the 29th of November a committee was appointed to correspond with the friends of America in other countries: it was called the Committee of Secret Correspondence, till April, 1777, when the name was changed to that of Committee of Foreign Affairs. On the 13th of December the report of a committee appointed to devise ways and means for fitting out a naval armament was adopted, and another committee named to carry it into execution. These were all acts of a central sovereign government, though the title was not yet assumed. In the same spirit was the answer of Congress to a letter from Massachusetts complaining of the want of a regular form of government, in which the colony was advised to consider the offices of governor and lieutenant-governor as vacant, and to elect an Assembly to govern them according to their charter. Similar advice was given by the third Congress, in 1776, to New Hampshire, South Carolina, New Jersey, and Virginia, and was adopted by these colonies. Before the second Congress dissolved, Georgia had elected delegates; and the members of Congress despairing of any of the mainland colonies wrested from the French and Spaniards joining their standard, had forbidden all exportations to Quebec, Nova Scotia, and East and West Florida, and prohibited the supply of provisions to British fisheries on the American coast. Thus, before the adoption of the Declaration of Independence, the United Colonies had already all the essentials of their future general government as well as states' governments. The want of a chief magistrate they supplied by appointing an Executive Committee of twelve, one-third of whom were to retire every year by rotation.

The Declaration of Independence was mainly useful as affording a pledge, both to American citizens and foreign states, that those who had seized the helm of affairs in America would stand firm: that there was no longer any chance of a compromise between the mother country and the colonies. This step, though bold, was not so rash as might at first sight appear on the part of a population scarcely amounting to two millions and a half. Great Britain, though a powerful nation, had not then developed the immense manufacturing resources which carried her through the colossal wars of the French Revolution. On the other hand, the leaders in the United States were not the simple Arcadians, the men fresh from the plough and forest, which it was then the fashion to represent them. For example, Franklin by his long services in the Philadelphia Assembly, by his discharge of the office of postmaster-general, by his share in the commissariat exertions when Braddock landed, by his participation in the Congress at Albany, and by his residence in England as agent for more than one State, had as much practical experience of statesmanship as any minister he might have to contend with. Again, there were many officers in America who had acquired a knowledge of tactics in the wars against the French and Spaniards. The provincial bars and legislative assemblies were schools in which many apt coadjutors of the Franklins of America had been trained, and the whole adult population had been trained not only to the use of fire-arms, but to act together in companies. The result of the war was a question of time: America had only to stand on the defensive. The period for which Great Britain could protract the struggle was limited by her finances (and her financial necessities had forced on the quarrel); and the utter ignorance of the strength and character of the provinces which prevailed in England caused measures to be adopted which never could bring the war to a termination. In addition the Americans calculated with right upon the wish of France to see Britain stripped of its colonies, upon the desire of Holland to participate in the trade of those colonies, and upon kindred motives influencing other nations, as certain to procure for them underhand if not avowed assistance.

In 1777 a measure was adopted with a view to increase the coherence of the Union. Articles of Confederation and perpetual union between 'The United States of America' were drawn up by Congress and sent to the legislatures of the several States, with the request that, if they approved of them, they would authorise their delegates to ratify the contract in Congress. By these articles the States were to bind themselves to a league for common defence; the free inhabitants of each state were to be citizens of the whole Union; each state was to retain its sovereignty, and every power not expressly delegated to Congress. Congress was to consist of delegates from all the States, no state sending less than two or more than seven; Congress was to be invested with the power of determining on peace and war; of sending and receiving ambassadors, and forming alliances; of granting letters of marque, and establishing courts of admiralty; of deciding in all territorial disputes between two or more states; of striking money and regulating weights and measures; of regulating the Indian trade; of regulating the continental army and navy, and commissioning their officers. These articles, if adopted, were to be binding until alterations were made by Congress and approved by the legislatures of every state. Massachusetts, Rhode Island, Connecticut, Vermont, New York, Virginia, and South Carolina acceded to this confederation in 1777; New Hampshire, New Jersey, Pennsylvania, North Carolina, and Georgia, in 1778; Delaware, in 1779; Maryland, not before 1781. An essential improvement in the internal economy of Congress was the substitution, in 1781, of three executive departments—of Finance, War, and Marine, with a secretary at the head of each, for the old executive committees. Under this make-shift constitution, in which the legislative, executive, and judicial functions were all vested in one body, the United States brought the war with Great Britain to a successful termination in 1783, and scrambled on for six years longer before they attempted to organize the general government upon a better system. For a war of defence, the independent action of the several states was of material assistance to the continental army; and the mingling of France and Spain diverted great part of the power which Britain would otherwise have concentrated upon her former colonies. In 1778 the first public audience was given by the king of France to the American ambassadors. In April, 1782, Holland recognized the independence of the United States. In 1783 peace was concluded between Great Britain and the United States. Their independence was recognized, in the course of the same year, by Sweden, on the 5th of February; by Denmark, on the 25th; by Spain, on the 24th of March; and by Russia, in July. Treaties of amity and commerce were concluded with all these nations, and thus the United States of North America took their place among the nations of the earth. The original extent of the territory of the United States was from the British Possessions on the north to Florida, which had again fallen to Spain, on the south; and from the Atlantic on the east to the Mississippi on the west.

The inadequacy of the Congress, as constituted under the articles of Confederation, to exercise the functions of government, soon became apparent. A common feeling of the want of a more efficient frame of government united Madison, Hamilton, and Jay, in 1786, in the composition of the letters which were subsequently collected and published under the name of 'The Federalist.' These publications gave form and direction to the vague wish for improvement which had pervaded the Union. A convention, sanctioned by the recommendation of Congress, assembled at Philadelphia, in May, 1787, to frame a constitution for the United States. The great difficulty in this task arose from the jealousies which existed between the large and the small states: it was obviated by instituting a legislature of two chambers, the members of the one (the House of Representatives) to be elected directly by the people in proportion to the population. The members of the other (the Senate) to be elected as each state should determine, two for each state. A president was to be elected for four years, and to be reëligible at the close of the term. A supreme court of judiciary was also to be created. A qualified negative on the proceedings of the legislature was given to the president; and a right of concurrence in the ratification of treaties to the senate. The power of taxation was conferred upon the legislature. In other respects the provisions of the new constitution were a recognition of those of the old confederation. On the 17th of September, 1787, this constitution was signed by all the members of the convention present, except three. It was then sent to the state legislatures, for the purpose of being submitted in each state to a convention of delegates chosen by the people. It was nearly a year before the requisite number of states had pronounced their decision. Before the close of 1788 however all the states except Rhode Island and North Carolina * had adopted the constitution. An act was passed by Congress appointing the first Wednesday of February, 1789, for the people to meet and choose

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* These dissentient states ratified the Constitution on the 29th of May, 1790.

electors, and the first Wednesday of March following for the electors to meet and choose a president.

A quorum of the House of Representatives had met at New York on the 1st of April, and elected a speaker; a quorum of the Senate had met on the 6th, and elected a speaker *pro tempore* to count the votes for president. George Washington, it was found, had been unanimously elected President, and John Adams Vice-President of the United States. Washington took the oath of office on the 30th of April, and opened the proceedings of Congress by a speech. On the 21st of May a resolution was adopted by the House of Representatives to the effect that there ought to be established: 1, a department of foreign affairs, with a secretary at its head removeable by the president; 2, a treasury department, with a secretary at its head, removeable by the president; 3, a department of war, with a secretary at its head, removeable by the president. Bills were brought in to give effect to this resolution, which passed both Houses, and were sanctioned by the president. The constitution was now completely in operation. Since that time down to the present day it has only experienced a few immaterial modifications—in the mode of voting for president and vice-president; in the substitution of an annual message from the president to Congress instead of a speech delivered in person at the opening of the session; and in the addition of a secretary of the navy, a postmaster-general, and an attorney-general to the president's cabinet. The refusal of Washington and Jefferson, the first and third presidents, to be elected a third time, appears to have had the effect of establishing it as a rule that no president shall continue to hold the office for more than two terms. Even during the preliminary discussions upon the constitution, the two great parties which assumed the names of Democrats and Federalists had ranged themselves in opposition to each other: in transacting the business of the senate, their differences soon became more marked, and their organization more complete. This ramification of two rival parties throughout all the States is, perhaps, a guarantee for the perpetuity of their union. Having now endeavoured to trace the growth of the Federal Constitution, from its first development in Franklin's scheme for a colonial union, to the commencement of the operation of the Constitution of 1789, it will suffice in a sketch like the present to subjoin a list of the chief magistrates, and to indicate briefly the most characteristic executive and legislative transactions of the government.

PRESIDENTS OF THE UNITED STATES.

George Washington . . .	1789	to	1797
John Adams	1797	„	1801
Thomas Jefferson . . .	1801	„	1809
James Madison	1809	„	1817
James Monroe	1817	„	1825
John Quincy Adams . .	1825	„	1829
Andrew Jackson	1829	„	1837
Martin Van Buren . . .	1837	„	1841
William Henry Harrison .	1841.		

President Harrison died a month after his inauguration, and was succeeded by the Vice-President John Tyler.

The first term of Washington's presidency passed off tranquilly. The very authors of 'The Federalist'—the authors of the constitution—took, it is true, the lead in opposite parties; but both felt that their form of government was an untried experiment, and this checked the warmth of all disputants. So strongly was this feeling impressed even upon so unquailing a democrat as Jefferson, that he requested Washington to allow himself to be elected a second time in order to give greater assurance of permanence to their young institutions. The season of tranquillity was usefully employed in completing the framework of government, by creating the departments of state, and organizing the judiciary of the United States. Towards the close of the second term this caution decreased, and the wrangling between the democrats and federalists waxed fiercer. When John Adams succeeded Washington, he was unshielded by the reverence universally paid to his predecessor, and the wrangling of party became bitter in the extreme. Both of the two first presidents belonged, from taste and from principle, to the Federalist party, and the Democrats of course constituted the opposition. Their themes of attack were the alleged affectation of monarchical etiquette on the part of the presidents and their retainers, and the tendency unduly to favour England, and cherish a feeling of hostility against France. This is apt to appear to us the pedantry of democracy, but they were right: there were no materials for making a king or aristocracy in the United States; there was no possible alternative between a military despotism and democratic institutions: it was therefore necessary that as warm a spirit of loyalty to democracy should be cherished in the United States, as of loyalty to kingly power in England. The sense of the nation was with the democrats; Adams was not elected a second time, and Jefferson, the democratic leader, succeeded him. To the stormy period of Adams's presidency, however, America is indebted for the organization of its naval department.

'We will show,' said Jefferson writing to a friend immediately after his election, 'how the ship will sail when laid upon the democratic tack.' The prominent operations during the eight years he held office were:—the extension of the territory, and completion of the arrangements of its progressive settlement, and the organization of the diplomatic and consular service. The danger likely to result from the unequal territorial extent of the colonies had been foreseen by Franklin. The constitution confirmed to each state the territory it already possessed; but indirectly gave to Congress the right of acquiring all new territories for the general government, of persuading the larger states to allow new ones to be erected on part of their territory, and of admitting new states into the Union. The questions which soon arose respecting the title of the United States to navigate the Mississippi soon suggested the expediency of acquireing a title to the lands beyond it. This was accomplished during Jefferson's administration by the purchase of Louisiana from France, which was followed by the cession of Florida by Spain. Jefferson took prompt measures for exploring the new domain, settling boundaries, and organizing territories and states. The continual adoption of new-formed states into the Union, although recommended by the principles of justice, has a tendency to give an undue strength to the uncultivated and rash tempers of the backwoodsmen in Congress; and Jefferson, in his loyalty to democracy, erred on the side of mob-courtiership. It was one of his boasts that, in consequence of his financial arrangements, 'no tax-gatherer would ever enter the house of an American citizen.' The brag was a fallacy—and worse: it encouraged in the popular mind the habit of dwelling exclusively on their rights and neglecting the contemplation of their duties. The power of making it was purchased by a breach of faith to the national creditor; and this example of bad faith, and this encouragement of popular self-will, have borne bitter fruits in the refractory conduct of Maine regarding the north-east boundary, in the lawless conduct of the sympathizers on the Canadian frontier, in the irregular conduct of some senators regarding the Oregon boundary, in the 'nullifiers' of the southern states, and in the 'repudiation' of their just debts by three states and one territory, and the neglect to make arrangements for the honest payment of theirs by four other states.

The efficacy of the diplomatic service as organized by Jefferson, and the adequacy of the naval and military organization for defence, was tried to a certain extent during the eight years' presidency of his successor. But the little war in which the United States were then engaged was a trifle in comparison with the point of international law then raised and still unsettled—the right of search in the form it assumed in the quarrel between Britain and America. The objection to concede the right of search on the part of the Americans arose principally from their fear of the British claim of right to impress British seamen out of any merchant vessels in the time of war. There was another unsettled point involved: the Americans adopt a man as a naturalized citizen after a residence of a certain number of years; Great Britain refused to acknowledge that the citizenship impressed upon a man by his place of birth or parentage was dissolved by such an adoption. The dispute is one of system, not of an isolated principle; the system of the new state sprung from the last social revolution is opposed to the system of the old-established state. As yet America, if not able to establish the principles of international law, involved in her pleas upon this complicated question of the right of search, has been able to prevent the opposing principles being forced upon her acceptance. Madison's administration is remarkable also for the progress made under it in the practical enforcement of the views of those who seek to favour domestic industry by restrictive enactments: the more so that his own enlightened opinions were hostile to their theory.

The administration of Madison's successor, Monroe, was remarkable only for the efforts of the United States government to encourage the growth of independent states over the whole of America, and to enter into diplomatic relations with them.

The administrations of Presidents Jackson and Van Buren have been principally characterized by the disputes regarding banks, and the relations which ought to subsist between these institutions and the state. This is the branch of political economy which has hitherto been least assiduously cultivated, and with the least satisfactory results. It is therefore no discredit to the American government to say that it has blundered in this matter as egregiously as all other governments have done. But in the United States there was a political element further to complicate the discussion. The Federalists (or Whigs, as the party has of late been called) regarded a national bank as the means of giving to the central government an additional power which they thought it wanted, and they used the National Bank in that way. The Democrats maintained that Congress had exceeded its constitutional powers in chartering a national bank. There was a motley mixture of incompatible opinions in the ranks both of the assailants and advocates of a national bank; and the consequence has been that the banking system of the United States has fallen into a condition of perfect lawlessness and confusion. Another question which has been daily growing in importance during the last few years, is that of domestic slavery. The introduction of the new states has on the whole been unfavourable to the progress of humane and just views of this question, and, as far as the rights of the negro are concerned, the public mind and morals in the United States have lamentably retrograded. Here we close our brief historical retrospect, convinced that there are elements of endurance in the political institutions of the United States, and a capacity of gradual improvement. The character of the citizens, who have alternately formed and been formed by their institutions, is undeniably entitled to respect for its energy, enterprise, and many other excellent qualities; its defects are equally undeniable, and the more strongly felt by Europeans as being alien to the prevailing habits, opinions, and prejudices of Europe. The most glaring of these defects, however, are less attributable to the institutions of the Americans than to their position as settlers in a wilderness.

Territory.—The territory of the United States of North America is bounded on the east by the Atlantic, on the west by the Pacific Ocean. The most southern point is the south termination of Florida, about 25° N. lat. and 81° W. long. of Greenwich. From this point to the mouth of the river Sabine, about 29½° N. lat. and nearly 94° W. long. of Greenwich, the United States are bounded by the Gulf of Mexico. The remainder of the southern boundary is an arbitrary line, settled by the treaty concluded between Spain and the United States in 1819, and since confirmed by conventions with the republics of Mexico and Texas, which now occupy the territory formerly belonging to Spain. This line begins on the Gulf of Mexico, at the mouth of the river Sabine; continues north along the western bank of that river to the 32nd parallel of N. lat.; thence due north, till it strikes the Rio Roxo of Nachitoches; thence along the course of that river, west to the 100th degree of longitude west of Greenwich; thence by a line due north to the river Arkansas; thence along the course of the Arkansas to the point on the 42nd degree of N. lat. nearest to its source; and thence along that parallel to the Pacific. The northern boundary has been fixed by treaties with Great Britain, from the mouth of the St. Croix, at the entry to the Bay of Fundy, as far west as the point at which the 49th degree of N. lat. intersects the ridge of the Rocky Mountains which forms the watershed between the head-waters of the Columbia river and those of the south branch of the Saskatchawah. Beginning at the mouth of the St. Croix, the line ascends that river to its source; from a monument erected at the source it runs north in a straight line till it meets the river St. John; then up along the mid-channel of that river to the mouth of the St. Francis; up the St. Francis to the outlet of the lake Tohenagameck; it then curves round the north-east edge of the basin to Hall's Stream, one of the head-waters of the Connecticut; down the mid-channel of that stream to a line surveyed and marked in 1774 as the 45th degree of N. lat.; along that line westward to the St. Lawrence; thence along the middle of that river and of the lakes Ontario, Erie, Huron, and Superior, to Fort Charlotte in 48° N. lat.; thence by Saganaga, Sturgeon, and Rainy lakes to the north-west point of the Lake of the Woods; thence by a line due south to the 49th parallel of N. lat., and along that parallel till it strikes the crest of the Rocky Mountains. From this point to the Pacific the boundary between British America and the United States is yet unsettled. Neither government has yet stated articulately the extent of its claims; but American writers are in the habit of asserting that from the most western point already determined the boundary ought to run along the summit ridge of the Rocky Mountains to 54° 40′ N. lat., and thence along that parallel west to the most southern of the Russian settlements on the coast; British writers, on the other hand, maintain that the boundary ought to run from the most western point already determined to the mouth of the Columbia river, in 46° 19′. Neither state can rest its claims upon priority of maritime discovery. If overland expeditions of discovery and settlements by trading companies can yield a title, the boundary claimed by the British appears to be the most equitable, for it divides the territory in part explored by MacKenzie in 1793, and occupied by agents of the North-west and Hudson's Bay companies previous to 1811, from the territory traversed by Lewis and Clarke, in 1803-4, and occupied by the agents of Mr. Astor of New York, in 1811. The features and general conformation of the territory contained within these limits is very imperfectly known: even in the settled districts there is a great want of accuracy and precision in the maps and geographical descriptions. From this censure even the recent maps of Mr. Burr (topographer to the House of Representatives) are not exempted. Some able but partial coast surveys have been executed by the officers of the United States navy. The physical geography of the United States has been given under the heads of the several States, of the rivers Columbia, Mississippi, Missouri, &c.; the mountains Alleghany, &c., the lakes Erie, Ontario, &c. Here it will suffice to remark that this extensive region is naturally divided into three parts, widely differing in their charateristic features, by the Alleghany and Rocky Mountain ranges: in the centre the enormous drainage basin of the Mississippi, and on either side of it the eastern and western sea-boards. There is a remarkable parallelism between the physical structure of this part of the northern continent of America and that part of the southern contained between the parallel of the head-waters of the southern affluents of the Amazons and the parallel of the embouchure of the river Plata: the Rocky Mountains correspond to the Andes; the Alleghany range to the mountains of Brazil; and both in the northern and southern continents the parallel mountain-systems are connected by a tract of undulating country of no great elevation, forming a watershed between river-systems which flow respectively to the north and to the south.

Population.—The last census, taken in 1840, enumerates only the inhabitants of the settled districts, the territories and states, and in them only the white and negro populations. The most recent estimate we have seen of the numbers of the aboriginal copper-coloured race within the territory of the United States, rates them at no more than 200,000, mostly to the west of the Mississippi. In the following table the number of square miles each State has been estimated to comprise within its boundaries has been stated, along with the number of inhabitants; and also the year in which each joined or was admitted into the Union.

Education, &c.—In 1833 it was estimated that the proportion of pupils in common schools was, to the whole population,—in New York as 1 to 3·9; in Massachusetts, Maine, and Connecticut, 1 to 4; in all New England, 1 to 5; in Pennsylvania and New Jersey, 1 to 8; in Illinois, 1 to 13; in Kentucky, 1 to 21. According to the Census of 1840 there are in the United States 173 universities or colleges, containing 16,233 students. The editors of the 'American Almanac' (published at Boston) appear to think this an over-estimate: they enumerate 103 colleges with 9936 students. 'By students,' they say, 'with the exception of a few in the colleges of the southern and western states, is meant under-graduates, or members of the

NAMES OF STATES.	Admitted into the Union.	Extent in Sq. Miles.	POPULATION ACCORDING TO CENSUS OF 1840.			
			Whites.	Free Coloured.	Slaves.	Total.
Maine	1820	32,628	500,438	1,355	..	501,793
New Hampshire	1778	9,491	284,036	537	1	284,574
Massachusetts	1777	7,500	729,030	8,669	..	737,690
Rhode Island	1777	1,340	105,587	3,238	5	108,830
Connecticut	1777	4.764	301,856	8,105	17	309,978
Vermont	1791	10,212	291,218	730	..	291,948
New York	1777	46,085	2,378.890	50,027	4	2,428,921
New Jersey	1778	8,320	351,588	21,044	674	373,306
Pennsylvania	1778	44,000	1,676,115	47,854	64	1,724,033
Delaware	1779	2.120	58,561	16,919	2,605	78,085
Maryland	1781	13,950	318,204	62.078	89,737	470,019
Virginia	1777	64,000	740,968	49,842	448,987	1,239,797
N. Carolina	1778	48,000	484,870	22,732	245,817	753,419
S. Carolina	1777	25,000	259,084	8,276	327,038	594,398
Georgia	1778	62,000	407,695	2,753	280,944	691,392
Alabama	1819	46.000	335,185	2.039	253,532	590,756
Mississippi	1816	45,760	179,074	1,366	195,211	375,651
Louisiana	1812	48,220	158,457	25,502	168,452	352,411
Tennessee	1796	40.000	640,627	5,524	183,059	829,210
Kentucky	1792	42,000	590,253	7,317	182,258	779,828
Ohio	1802	39,128	1,502,122	17,342	3	1,519,467
Indiana	1815	37,000	678,702	7,165	3	685.866
Illinois	1818	52,000	472,254	3,598	331	476,183
Missouri	1821	63,000	323,888	1,574	58.240	383,702
Arkansas	1836	55,000	77,174	465	19,935	97,574
Michigan	1836	60,000	211,560	707	..	212,267
Florida T.	..	45,000	27,943	817	25,717	54,477
Wisconsin T.	..	100,000	30,749	185	11	30,945
Iowa T.	..	200,000	42,924	172	16	43.112
D. of Columbia.	..	100	30,657	8,361	4,694	43,712
	Totals .	1,265,618	14.189,705	386,293	2,487,355	17,063,353

four collegiate classes, not including such as are pursuing professional education, or such as are members of a preparatory department.' There are 3242 academies and grammar-schools, containing 164,159 students. As in England, legal and medical education in America is in great measure conducted by bodies external to the colleges or universities; and this is even the case to a considerable extent with theological education. The colleges in general contain only a Faculty of Arts. Several of the 103 enumerated in the 'American Almanac' are not in full operation, and scarcely deserve a place in the list. The libraries of none of them exceed 53,000 volumes, and only 19 have 10,000 volumes and upwards. There are 28 medical schools, 39 theological schools, and 10 law schools in the Union. The schools for law are much less frequented than those for the other learned professions. Of the 103 colleges, 11 are under the direction of the Baptists; 7, of the Anglican Episcopalians; 12, of the Methodists; 8, of the Roman Catholics; 1, of the Universalists: the prevailing religious influence in the rest is, in New England, Congregationalism; in the other states, Presbyterianism. Elementary education in many parts of the United States is more generally diffused than is the case in Great Britain; and the higher branches of education are well taught in some colleges. The principal religious denominations are:—Baptists, 8973 congregations, with 628,000 communicants; Presbyterians, 3744 congregations, with 355,000 communicants; Congregationalists, 1300 congregations, with 150,000 communicants; Episcopalians, 950 congregations, with 55,247 communicants; Roman Catholics, 512 congregations; Methodists, 906,303 communicants; Lutherans, 750 congregations, 62,266 communicants; German Calvinists, 600 congregations, 30,000 communicants; Dutch Calvinists, 197 congregations, 22,515 communicants; Friends, 500 congregations; 1000 congregations, with 150,000 communicants, who designate themselves simply 'Christians;' 15,000 Jews, and a number of Menonites, Moravians, Mormonites, New Jerusalemites, Shakers, Tunkers, Unitarians, and Universalists.

To form a just estimate of the science and literature of America, the social position of the nation must be taken into account. Till 1775 the States formed part of the British empire; and in their intellectual discipline and imaginative associations they are Englishmen still. Their older literature is that of England; their modern literature is a sister school formed under the influence of the same models and examples. It has been too much the custom to weigh the young literature of America against the whole literature of England: it is the current literature of the day in each country that ought to be compared with that of the other. The exertions made in America to preserve the materials out of which its yet brief history must be extracted put to shame states of longer standing and greater resources. The private journals of Congress, the secret debates of the Convention which framed the constitution, the diplomatic correspondence of the Revolution, the journals, correspondence, and other papers of Franklin, Washington, Jefferson, Adams, Jay, Madison, Gouverneur Morris, and others, have either been published or are in the course of publication. It is perhaps yet too early to expect a history of the United States, although Mr. Sparks is understood to be preparing one; but there are many valuable biographies of the distinguished revolutionary characters by Marshall, Sparks, Tucker, and others. Washington Irving's 'History of Columbus and his Cotemporaries,' and Prescott's 'Ferdinand and Isabella,' deserve honourable mention. Jonathan Edwards and Franklin occupy a high rank among metaphysicians and moralists. In political economy Cooper (not the novelist) and Tucker have published useful works. The Journal of Professor Silliman and the Transactions of several of the learned societies of the United States bear witness to the zeal with which natural history and science are cultivated. The poetry of Bryant, Mrs. Sigourney, and some others, is characterized by considerable play of fancy, unexceptionable taste, and an elevated yet kindly tone of morals. Miss Sedgwick and Fennimore Cooper stand at the head of American novelists: the former, for quiet graphic pictures of domestic life, is equal to any of her fair rivals on this side of the Channel; and the latter is unequalled for the power with which he depicts the elementary strife of the ocean and the interest he lends to its adventures. To the head of miscellaneous literature belong Washington Irving's inimitable 'Knickerbocker' and the poetical ornithology of Audubon. There is an extensive reading public in America. Independent of books (and in addition to the works of their own authors all the best English publications are reprinted in the United States as soon as imported), there were published within the Union in 1840—138 daily, 1141 weekly, and 125 semi or tri-weekly newspapers, and 227 literary, scientific, religious, and political periodicals appearing at longer intervals. But the just boast of the United States is in its benevolent institutions; more especially in the judicious yet indefatigable zeal with which all means have been tried to ameliorate the condition of the blind, the deaf and dumb.

Agriculture, Manufactures, and Commerce.—The raw products of the industry of the United States may be classed under the heads—Mines, agriculture and horticulture, fisheries, the forest. The products of their mines consists of iron, lead, and other metals; coal, kitchen salt, and stone for building. In 1840 there were produced 286,903 tons of cast-iron, and 197,233 tons of bar-iron; 30,497 persons were employed in this branch of industry, and the capital invested in it amounted to nearly 20,500,000 dollars. In the same year 31,239,453 tons of lead were produced by the labour of 1017 men, and the investment of 1,346,756 dollars. The value of the gold collected in the Union was 529,605 dollars; the collection employed 1046 men, and required a capital of 234,345 dollars: the other metals were worth 370,614 dollars, and were raised by the labour of 728 men and a capital of 238,989 dollars. Of bituminous coal, 27,603,191 bushels were raised, and of anthracite 863,489 tons (of 28 bushels each): this gave employment to 6817 men, and set in motion a capital of 6,224,464 dollars. 6,179,174 bushels of domestic salt were produced by the labour of 2365 men, with a capital of 6,998,045 dollars; granite, marble, &c. were quarried to the value of 3,695,884 dollars, by the investment of a capital of 2,540,159 dollars, and the employment of 7859 men. The most productive iron-mines are in Massachusetts, Vermont, New York, Pennsylvania, Tennessee, and Ohio; lead is most abundant in Illinois, Missouri, and the district of Iowa; gold is confined to Virginia, North and South Carolina, Georgia, Alabama, Tennessee, and Illinois. Pennsylvania and Virginia are the great coal countries: next to them is Ohio. Salt and stones are more equably diffused through settled parts of the Union. The total agricultural produce of the Union in 1840 was as follows:—horses and mules, 4,335,699; neat cattle, 14,971,586; sheep, 19,311,374; swine, 26,301,293; and the estimated value of poultry, 9,344,410 dollars. There were 84,823,272 bushels of wheat, 4,161,504 of barley, 123,071,341 of oats, 18,645,567 of rye, 7,291,743 of buckwheat, 377,531,875 of Indian corn, 35,802,114 pounds of wool, 1,238,502 pounds of hops, 628,303 pounds of wax, 108,298,060 bushels of potatoes, 10,248,108 tons of hay, 95,251 tons of hemp and flax, 219,163,319 pounds of tobacco, 80,841,422 pounds of rice, 790,479,275 pounds of cotton, 61,552 pounds of silk cocoons, 155,110,809 pounds of sugar were made, and 5,088,891 cords of wood sold. The value of the dairy produce of the year was estimated at 33,787,008 dollars; of the orchards, 7,256,904; of the market-gardens, 2,601,196; of nurseries and florists, 593,534. It is estimated that 8553 men were employed in nurseries and market-flower and kitchen gardens, by a capital of 2,945,774 dollars: 124,734 gallons of wine were made in the course of the year. The fisheries yielded 773,947 quintals of dried and smoked fish; 472,359 barrels of pickled fish; 4,764,708 gallons of spermaceti oil; 7,536,778 gallons of whale and other fish oil; whalebone and some minor articles to the value 1,153,234 dollars. A capital of 16,429,620 dollars and 36,584 men were employed in the fisheries. The forests of the Union yielded lumber to the value of 12,943,507 dollars; 619,106 barrels of tar, pitch, turpentine, and resin; 15,935 tons of pot and pearl ashes; skins and furs to the value of 1,065,869 dollars, and ginseng and minor articles for 526,580 dollars.

The whole capital invested in manufactures in the United States was estimated, in 1840, to amount to 267,726,579 dollars. Of this sum 20,620,869 dollars were invested in the manufactures of metals, granite, &c., bricks and lime: the number of men employed was 33,218: 65,858,470 dollars were in grain, oil, and saw mills; 7,404,562 barrels of flour were manufactured; 60,788 men employed. Capital to the amount of 41,917,401 dollars was employed in building; and 6,989,971 dollars in the making of furniture: these two branches employed 103,504 men. The value of ships and other vessels built in 1840 was 7,016,094 dollars. In the woollen manufactures the capital invested amounted to 15,765,124 dollars, and 21,342 men were employed by it: in the cotton manufactures the capital was 51,102,359 dollars: the number of persons employed 72,119: in the silk manufactures the capital was 274,374; the workpeople were 767: in the flax manufactures a capital of 208,087 dollars employed 1628 persons; and 4,368,991 dollars were invested in mixed manufactures, giving employment to 15,905 persons. Massachusetts alone contained more than one-third of the cotton, and more than one-third of the woollen manufactories. The states next in order in these two branches of industry were New York, Rhode Island, Pennsylvania, Connecticut, Maryland, and Virginia. Among the agricultural population home-made goods were produced to the value of 29,023,380 dollars. The value of the machinery manufactured during the year was 10,980,511 dollars; 13,001 men were engaged in making it. In the manufacture of tobacco a capital of 3,437,191 dollars was invested, and 8384 persons were employed; in tanning, &c. 15,650,929 dollars, 26,018 men; in manufactures of leather, 12,881,262 dollars; in the manufacture of soap and candles, 2,757,273 dollars, 5641 men; of hats, caps, and bonnets, 4,485,300 dollars, 20,176 persons; glass, 2,084,100 dollars, 3236 men; earthenware, 551,431 dollars, 1612 persons; sugar-re-

States and Territories.	Value of Imports, 1840-41.			Value of Exports, 1840-41.		
	In American Vessels.	In Foreign Vessels.	Total.	Domestic Produce.	Foreign Produce.	Total.
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
Maine	574,664	126,297	700,961	1,078,633	12,932	1,091,565
New Hampshire	61,585	12,116	73,701	10,261	87	10,348
Vermont	246,739	..	246,739	264,005	13,982	277,987
Massachusetts	18,835,492	1,482,511	20,318,003	7,397,692	4,089,651	11,487,343
Rhode Island	333,929	5,663	339,592	266,276	12,189	278,465
Connecticut	293,221	2,768	295,989	599,348	..	599,348
New York	66,688,750	9,024,676	75,713,426	24,279,608	8,860,225	33,139,833
New Jersey	1,919	396	2,315	19,166	..	19,166
Pennsylvania	9,840,354	506,244	10,346,698	4,404,863	747,638	5,152,501
Delaware	1,188	2,088	3,276	38,585	..	38,585
Maryland	5,348,866	752,447	6,101,313	4,789,160	158,006	4,947,166
D. of Columbia	53,863	23,400	77,263	764,835	4,496	769,331
Virginia	351,917	25,320	377,237	5,628,910	1,376	5,630,286
North Carolina	214,731	5,629	220,360	383,056	..	383,056
South Carolina	1,217,955	339,476	1,557,431	8,011,392	31,892	8,043,281
Georgia	299 977	149,030	449,007	3,696,017	496	3,696,513
Alabama	400,358	120,461	530,819	10,969,826	11,445	10,981,271
Mississippi	..	..	..	..	..	..
Louisiana	8,141,088	2,115,662	10,256,350	32,865,618	1,521,865	34,387,483
Ohio	9,563	1,755	11,318	793,114	..	793,114
Kentucky	..	..	..	..	..	..
Tennessee	7,523	..	7,523	..	..	..
Michigan	137,608	192	137,800	88,529	..	88,529
Missouri	33,875	..	33,875	..	..	..
Florida	116,712	28,469	145,181	33,828	2,801	36,629
Total	113,221,877	14,724,300	127,946,177	106,382,722	15,469,081	121,851,803

fineries, &c. 1,769,571 dollars, 1355 persons; liquors, 9,147,368 dollars, 12,223 men; drugs, paints, &c. 4,507,675 dollars, 1848 men; cordage, 2,465,577 dollars, 4464 men; 5492 men produced hardware to the value of 6,451,967 dollars; 1744 men cast 274 cannons and made 88,073 small-arms. The capital invested in powder-mills was 875,875 dollars; the men employed 496. There were invested in the manufacture of paper 4745 dollars, and 4726 men employed; in printing and binding, 5,873,815 dollars, 11,523 men; in the manufacture of musical instruments, 734,370 dollars, 908 men; of carriages, &c., 5,551,632 dollars, 21,994 men.

The 'American Almanac' for 1843, in its curious and elaborate analysis of the census of 1840, gives a table illustrative of the distribution of capital engaged in commerce through the different states of the Union. From this table it appears that there are in the United States 1408 commercial houses and 2881 commission houses engaged in foreign trade, the joint capital of which amounts to 119,295,367 dollars; that there are 57,565 retail establishments, with a capital of 250,301,799 dollars; and 1793 lumber-yards, with a capital of 9,848,307 dollars, and giving employment to 35,963 lumberers; 17,594 men engaged in internal transportation, and 4808 butchers, packers, &c. To the same publication we are indebted for the preceding table of the exports and imports of each state and territory (as far as ascertained) during the year ending on the 30th of September, 1841.

The deposits of gold and silver at the mint of the United States and its branches in the year 1841 amounted to 2,166,723 dollars; the coinage to 2,240,321 dollars. The aggregate coinage of the years 1831-40 was 26,344,454 dollars, while that of the preceding ten years was only 16,781,047. This gives however but an inadequate idea of the circulating medium of the United States; and unfortunately the state of the banks throughout the Union—partly on account of their own reckless speculations, and partly on account of continual legislative tampering with vague and vacillating views, renders it impossible even to conjecture its real amount and value. The immense extent of navigable river-way and the number and size of the inland lakes materially facilitate the inland traffic of the States. The roads are in most parts necessarily, with a population so inadequate to the extent of territory, indifferent; but surprising efforts have been made to complete the lines of internal water-communication by canals, and a great extent of railways is in actual operation. According to Mr. Klein, the total mileage of railway chartered in the United States, in 1840, was 9378, and 3430 miles were then open and traversed by 475 locomotives. The most recent complete account of the canals only comes down to 1838: according to it the aggregate length of the canals then in operation was 2700 miles. The bankrupt law of the United States, a new law passed in February, 1842, has scarcely come into operation, and already an agitation for its repeal is in progress, which seriously threatens its permanence. The frequent bankruptcies, uncertainty of the law, and spirit of worse than levity with which several states have of late set an example of refusing to pay their debts augurs ill for the commerce of the United States. They have no capital of their own adequate to support their agriculture, manufactures, and commerce in their present extent. Their canals and railroads have been constructed upon credit, and not less than 212 millions of dollars have been lent for this purpose by English capitalists. The claims of English creditors on the States amount to 211,802,791 dollars, and these have been in great part expended upon internal improvements. In addition to this the credits given by English manufacturers to the American importing merchants are so long, that a new debt is always contracted before the old is paid. The average value of the annual imports from England is in reality a standing loan of capital for the Americans to trade upon. Without these advances their manufacturing and commercial activity must shrink and wither, and their equivocal conduct is endangering their continuance.

Organization of the General Government.—The president is the depository of the executive power of the state: the vice-president is ex-officio president of the senate, and successor to the president should he die during his term of office. The President is elected for four years, and may be re-elected. The electors meet in their respective states, and vote by ballot for the president and vice-president. The list of the ballot in each state is transmitted sealed to the president, who opens them and declares his successor. The president is commander-in-chief of the army and navy of the United States, and of the militia of the several states when called into active service of the United States; he has power to make treaties, provided two-thirds of the senate concur; he appoints the officers of state, ambassadors, consuls, and judges of the supreme court; he receives foreign ambassadors; he can grant reprieves and pardons for offences against the United States, except in cases of impeachment.

The cabinet consists of five heads of departments and an attorney-general, who hold office during the president's pleasure.

The department of state embraces the departments of home and foreign affairs; at its head is the secretary of state, who conducts all negotiations with foreign powers, and corresponds officially with the United States' ministers at foreign courts and foreign ministers in the United States; publishes and distributes treaties and Acts of Congress; preserves the originals of laws, treaties, and public correspondence; grants passports, preserves the evidence of copyrights, and has charge of the patent-office; and has charge of the seal of the United States. He has under him a diplomatic bureau with three clerks; a consular bureau with two; a home bureau with five; a patent office with a commissioner, examiners, draughtsmen, and mechanists.

The Treasury department is under a secretary, who superintends all the fiscal concerns of the government, and recommends to Congress on his own responsibility measures for improving the revenue. He has under him two comptrollers and five auditors, with their respective clerks, a treasurer's office, a register's office, a solicitor's office, and a land office.

The secretary of war superintends every branch of military affairs, the erection of fortifications, making of topographical surveys, leasing the national lead-mines, and the intercourse with the Indian tribes. Under him are a bureau of Indian affairs, a pension bureau, a quartermaster's bureau, a clothing and equipage bureau, a subsistence bureau, a pay bureau, a medical and surgical bureau, an engineer bureau, a topographical bureau, and an ordnance bureau. There are twelve military geographical departments in the United States; 57 general officers, and 83 medical officers. The officers of engineers are 39, the topographical engineers 36, the ordnance 311. There are two regiments of dragoons, with 1444 men; four regiments of artillery, with 2593 men; eight regiments of infantry, with 5843, and 779 recruits unattached. The aggregate militia of the United States is 1,668,387 men of all grades.

The navy department was separated from the general war department in 1798. The secretary issues all orders to the navy of the United States, and superintends the concerns of the navy generally. A board of navy commissioners was established in 1815, and attached to the office of secretary of the navy: it is intrusted with the ministerial duties of the office. The department of the navy consists of a secretary, the navy-board, and the office of the survey of the coasts of the United States. In the active navy of the United States there are six commodores; seven commanders of navy-yards and two of stations; 68 captains; 11 ships of the line, 15 first-class frigates, 2 second-class ditto, 18 sloops of war, 4 brigs, 10 schooners, 4 steamers, and 3 store-ships.

The General Post-Office is under the superintendence of a postmaster-general, who has the sole appointment of postmasters and making of contracts throughout the United States. The revenue arising from the General Post-Office has been principally expended in improving the establishment. Under the postmaster-general are a contract-office, an appointment-office, an inspection-office, and a chief auditor of the treasury for the Post-Office.

The judicial authority of the United States is vested in one supreme court, thirty-five district courts, and nine circuit courts. The supreme court consists of one chief justice and eight associate justices, who hold a court in Washington annually; an attorney-general, reporter, clerk, and marshal. Each district court consists of one judge, an attorney, marshal, and clerk. The circuit courts are composed of one associate justice, and the judge of the district in which it is held. The supreme court has exclusive jurisdiction in all cases to which a state is party, except cases between a state and its citizens; in suits or proceedings against ambassadors, it has appellate jurisdiction from the circuit courts, and authority to issue writs of prohibition to the district courts. The circuit courts have original jurisdiction in all suits of a civil nature at law or equity, concurrent with the courts of the several states, where the value in dispute exceeds 500 dollars, where the United States or an alien is a party, or where the suit is brought by a citizen of one state against a citizen of another. The circuit courts have appellate jurisdiction from the district courts. They have exclusive cognizance of offences against the United States. The district courts have jurisdiction in admiralty and maritime cases, in all suits against consuls and vice-consuls, in some minor offences against the United States, and in causes where an alien sues for a *tort* in violation of the law of nations.

The legislative authority is vested in a Congress, consisting of a Senate and House of Representatives; it must by law assemble at least once every year, on the first Monday of December. The Senate is composed of two members from each state; they are chosen by the legislatures of each state for six years, one-third of them being elected biennially. The Vice-President is President of the Senate ex-officio, and has a casting vote in equal divisions. The House of Representatives is composed of members from the several states, elected by the people for the term of two years. The representatives are apportioned among the different states according to population. To the present (twenty-seventh) Congress they have been elected one for every 47,700 persons; for the twenty-eighth they will be chosen in the ratio of one representative for every 70,680 persons, and one additional for every fraction of that number greater than the half. The law of 1842 requires that the representatives of each state shall be elected by districts composed of a contiguous territory, no one district electing more than one representative. The Congress has power to raise, maintain, and regulate a navy and army; to declare war and grant letters of marque and reprisals; to constitute tribunals inferior to the supreme courts; to define and punish piracies and felonies on the high seas and against the laws of nations; to frame general laws of naturalization; to establish post-offices and post-roads; to coin money and make laws for punishing forgers; to regulate commerce with foreign nations, the Indian tribes, and among the States; to impose and collect taxes for the common defence and welfare of the United States. All money-bills must originate in the House of Representatives.

(Holmes's *Annals of North America*; *Journals of Congress*; *Diplomatic Correspondence of the American Revolution*; Hutchison's *History of Massachusetts*; Marshall's *Life of Washington*; Sparks's *Life of Washington*; Franklin's *Memoirs and Correspondence*; Tucker's *Life of Jefferson*; Jefferson's *Memoirs, Correspondence*, &c.; John Adams's *Correspondence*; *Lives* of Elbridge, Gerry, Josiah Quincy, H. Lee, &c.; Wirt, *Life of Patrick Henry*; Sparks's *Life of Gouverneur Morris*; *American Annual Register*; *American Almanac*, 1830-43; *The Federalist*; Clarke and Lewis, *Travels to the Source of the Missouri*, &c.; *Biography of the Signers of the American Declaration of Independence*; Jay's *Life of John Jay*; *Parliamentary Debates*, &c. &c.)

UNIVERSAL AND PARTICULAR (Logic). A proposition is *universal* when it makes its assertion or denial about every one of the things spoken of; and *particular* when it makes such an assertion or denial of some as implies that others are left unspoken of. Thus 'all men are mortal' is universal, and also 'no man is perfect.' But 'some men are born in England' and 'some animals cannot live in this climate' are particular. These are the direct logical forms, but it happens commonly that the universal and particular characters are expressed by a great variety of idiomatic turns, and even that forms of expression which, literally speaking, imply universality, are used in a particular sense. Thus 'men do not willingly abandon life' strictly means that all men are unwilling to quit life: nevertheless it would be generally understood to speak of most men—all but a few. Except when speaking of laws of nature or necessary conditions of the mind, few writers have much occasion for universal propositions, and consequently the forms of speech which belong to *all*, pass into use when the proposition is intended to be predicated only of *most*.

The particular proposition, in its pure logical form, is of very rare occurrence. The reader must understand that all which is not mentioned is, in the science of logic, considered as unspoken of: now the particular proposition of common life generally denies of the rest what it affirms of some, or affirms of the rest what it denies of some. Thus he who should say 'some men are mortal' would be held to utter an untruth, because he would be thought to imply that the rest are not; and a naturalist, wishing to state that some species of a certain animal have fur, in order to state just what his argument requires, would think it necessary to say 'some at least,' or to use some other form of speech which would signify that, for anything he said to the contrary, all the other species might have fur also. But the logical proposition is always understood to make all possible admission or allowance as to every matter which is not directly spoken of; and 'some men are mortal' means that nothing whatever is either said or implied about the rest.

The most common form of speech perhaps is the one compounded of the two particular propositions, the affirmative and the negative, of which the emphatic part is expressed, and the rest implied. Thus, two men going into a company, the first expecting to see all dressed in mourning, and the second thinking none would be so, would come away expressing the same fact in sentences of very different meaning. The first would say 'some were not in mourning,' the second would say 'some were in mourning,' both meaning to say 'some were and some were not,' but each giving only that part of the assertion which contained the (to him) unexpected fact. It would be desirable that writers on logic should make a closer analysis of the common forms of speech, and a comparison of them with the strict and true logical forms.

The universal proposition includes all cases in which there is nothing left unspoken of, and therefore contains all propositions in which the subject is an individual, or cannot be divided into parts. Thus, 'Milton was an Englishman' is as much a universal proposition as 'all men are mortal.' It was at one time a matter of discussion whether propositions asserting matter of individuals could be properly called universal; but whether this term were applicable or not, it was always seen that the rules of deduction, applying to such propositions, were precisely those which obtain in propositions about the appellation of which no doubt could exist. But the preceding proposition is not universal because it includes *all* Milton, but because it includes all *Miltons:* that is, all Miltons who can answer to a description which is implied in the word as there used. And if, by the closeness of the implied definition, and the number of conditions which are to be fulfilled, there be left but one of men alive or dead whom it is possible to mean, the proposition is not the less true. Thus, when every A is shown to be B, and every B to be C, it follows that every A is C, even though the description given of A is so close, that there can be found but one object answering to it in the world.

And just in the same manner as *all* may, logically speaking, be only one, so *some*, or those which are spoken of as some, may be one only, or several, or nearly all, or even all. Some As are Bs is logically true (such is the convention of the formal part of that science) when there is only one A which is B; and also when every A is B.

If we look at the specific elements of propositions, we find that, while the subject is defined, as to whether it is universal or particular, by the express addition of words, or by an implication which has the same effect, the character of the predicate follows the nature of the proposition, and depends solely upon whether it is affirmative or negative. In all affirmative propositions the predicate is spoken of particularly; in all negative propositions, universally. Thus, 'As are Bs' in itself does not describe the manner in which A is used: it may be some As or all As; but it does particularise the predicate, B. Here As (as many as are spoken of, be it some or all) are Bs; each one of these As is a B, but other Bs may or may not exist, about which consequently nothing is affirmed. 'All horses are animals;' all the horses make up as many of the animals as there are horses: under this form the particular character of the predicate is expressed. But if we say 'As are not Bs,' even though only one A should be here spoken of, yet every B is compared with it and rejected. What is meant is, that 'this one A is not any one whatsoever of all possible Bs.'

Formal logic, though an excellent exercise, is in some respects a dead letter unless the student take pains to trace the numerous idioms of language in which the affirmative or negative proposition is conveyed. So very nice are the circumstances, frequently of mere position or of context, by which the universal form is distinguished from the particular, that it would be easy to lay down an isolated sentence, of which no one should be able to say which of the two it is. For example, 'homicides are justifiable which are committed in self-defence,' and 'homicides which are committed in self-defence are justifiable.' Though probably the leaning of a grammatical critic would be to the supposition that the first should stand for 'All justifiable homicides are those which are committed in self-defence,' and the second for 'Among the justifiable homicides are, &c.,' yet no person would be sure of an author's meaning, whichever of the preceding forms he might use, until he had examined the context.

UNIVERSALS. [NOMINALISTS.]

UNIVERSE. This name is generally used, as the word *world* once was, to signify the collection of all created things. In modern language, 'the world' generally refers to the earth only, and the universe to all stars and planets. Before the reception of the Copernican theory, 'the world,' which signifies what we now call the universe, was naturally a synonyme for 'the earth,' which was supposed to be the principal part of the universe, all the other celestial bodies being only satellites. But since the time when other planets have been advanced to the dignity of being separate 'worlds,' the term universe has been gradually introduced into common language. It would almost seem as if this last word might one day become more particular in its meaning, since modern discoveries seem to point out that every nebula [MILKY WAY; HERSCHEL] may be 'a universe,' that is, an organization as extensive as the idea which was formed of *the* universe previously to those discoveries. If such should ever be the case, and if people should speak of thousands of universes as they now speak of thousands of worlds, some new term must be introduced under which to comprehend all those universes.

By the technical term *theory of the Universe* is always understood what is known of the general arrangement of planets, stars, &c., and of their connexion with one another.

UNIVERSITIES, lay corporations, to which, since the twelfth century, the charge of educating the members of what are called the learned professions has in a great measure been confided throughout Europe and the colonies founded by European states. [UNIVERSITY.]

The three oldest learned institutions to which the name University can with propriety be applied are those of Paris, Bologna, and Salerno.

It is impossible to fix a precise date at which the educational institutions of Paris can be said to have assumed the form and name of a university. As for the name (*universitas*), it was not confined in the middle ages to scientific bodies; it was used in a sense equivalent to our word *corporation*. There were 'universities of tailors' in those days. It was long before the name settled down into its present acceptation. The school of Bologna was a 'universitas scholarium,' that of Paris a 'universitas magistrorum,' because the former was a corporation of students, the latter of teachers. The oldest printed statutes of the university of Bologna are called 'Statuta et privilegia almae Universitatis Juristarum Gymnasii Bononiensis;' and in not a few universities we find an 'universitas juristarum' and an 'universitas artistarum' side by side: from this it appears that 'universitas' at one time approached nearly to the meaning of our word 'faculty.' What we now term a university was long designated indifferently 'schola,' 'studium generale,' or 'gymnasium.' The occasion of this vacillating nomenclature is explained by the history of universities.

The oldest document in which the designation 'universitas' is applied to the university of Paris, is a decretal of Innocent III., about the beginning of the thirteenth century. But as early as 1180 two decretals had been issued by Alexander III., the first of which ordained that in France no person should receive money for permission to teach. The glossa of Vicentinus says expressly, that this prohibition was directed against the chancellor of the university of Paris; and the second decretal alluded to exempts the then rector, Petrus Comestor, from the operation of the first; and much earlier than any legislative provisions of popes or kings we find the foundations of the university laid.

To almost every cathedral and monastery of Europe there had been, from a very early period, attached a school, in which all aspirants to priestly ordination, and such laymen as wished and could afford it, were instructed in the *Trivium* and *Quadrivium*. It appears from the letters of Abelard (died 1142), and from other contemporary sources, that the poorer establishments intrusted the conduct of this school to one of their number called the Scholasticus; and that the wealthier bodies maintained a Scholasticus to instruct the junior pupils in grammar and philosophy, and a Theologus to instruct the more advanced in theology. About the time of Abelard the great concourse of students who flocked to the episcopal school of Paris appears to have rendered it necessary to assemble the two classes of pupils in different localities; the juniors were sent to the church of St. Julian, while the theologians remained in that of Notre Dame. All who had studied a certain time, and undergone certain trials were entitled to be raised by the rector of the schools to the grade of teachers. This was done by three successive steps. The candidate was first raised to the rank of master, in which he acted for a year as assistant to a doctor (or teacher); then to the rank of baccalaureus, in which he taught for a year, under the superintendence of his doctor, pupils of his own; lastly, to the grade of independent doctor. The number of students rendered the profession of a teacher at Paris lucrative, and many from all nations embraced it. According to the custom of those unsettled times, they gradually formed themselves into a corporation for mutual support. The corporation consisted of the teachers of all the three grades, and stood under a rector elected by themselves. According to an agreement entered into in 1206, the rector was elected by the residents of the four nations—French, English or German, Picards, and Normans. Before this time, in 1200, Philip Augustus had confirmed the exclusive control of the rector over all students and teachers. The local separation of the artists from the theologians would have been of little consequence, but for the rapid progress which the Aristotelian philosophy made during and immediately after the life of Abelard. The speculations into which studious men were led by the writings of Aristotle necessarily led them to deal with topics which had hitherto been conceived to lie within the exclusive domain of theology. The consequences were frequent and bold attempts by individuals to modify the received doctrines of the church, clamours about heresy, persecutions, and counter-persecutions. All these contributed to bring about a tacit compromise between the professional theologians and the admirers of speculative philosophy: the former were left in possession of the pulpit and chairs of theology; the latter confined themselves ostensibly to literature and philosophy, and sought to avoid occasioning scandal by rarely overstepping the bounds of abstract inquiry. The progress of this tacit agreement may be traced in the writings of the learned from the time of Abelard down to that of Erasmus; under it grew up a class of literati, who may be called, although many of them took orders, secular scholars. It was the same incompatibility of the free spirit of speculative inquiry with the stability of a dogmatic theology which led to this compromise, that embittered the dispute about the claim of the mendicant orders to establish chairs of theology in the University of Paris about the middle of the thirteenth century. This controversy ended in the secession of the doctors of theology from the university, as it had for some time been called, and their incorporating themselves into a separate college or faculty. Their example was followed not long after by the doctors of canon law and medicine, who formed themselves into separate faculties. These faculties consisted exclusively of the actually teaching doctors (doctores regentes) of these three branches of knowledge. The masters and bachelors remained members of the university proper, which, from the secession of the theologians, canonists, and doctors of medicine, came in time to be called the Faculty of the Artists. From this period the university consisted of seven bodies or sub-incorporations—the four nations under their procurators, and the three faculties under their deans. The rector was the head of the university; he was elected by the procurators of the old university; no doctor of theology, canon law, or medicine could be elected or take part in the election. At first the rector was chosen by the procurators, but latterly by four electors, specially elected by each nation for that purpose. The Prevôt of Paris (so long as that officer retained any authority) was the conservator of the royal privileges in the university; the bishops of Meaux, Beauvais, and Senlis, of the papal privileges. In respect to criminal jurisdiction, the university stood immediately under the king, till A.D. 1200, when its members were transferred to the episcopal court of Paris: about the middle of the fifteenth century they were transferred to the Parliament of Paris. In regard to civil jurisdiction the University was originally under the bishop; in 1340 it was transferred to the court of the Prevôt of Paris; when the Chatelet succeeded to the judicial functions of the prevôt, the university was transferred to that court. The rector, with the procurators and deans, formed a court, which had jurisdiction in all complaints against teachers for incompetency or neglect of duty; and against students for disobedience to their teachers, the rector, or the discipline of the university, and in all cases between students, lodging-keepers, booksellers, stationers, &c. From the decisions of the rectorial court there was an appeal to the university, and from it to the Parliament of Paris. Each faculty (that of the artists included), had its own common school. In the faculty of canonists there were six professors (or doctores regentes); the number in the other faculties varied. At an early period colleges were established within the University of Paris by private families or religious orders. Originally they were intended exclusively for poor scholars, who were to live in them subject to certain rules of discipline. By degrees however, as more numerous and able teachers were employed in these colleges, they assumed the character of boarding-houses for all classes of students. In the fifteenth century the students who did not reside in any college had come to be regarded as exceptions from the general custom, and were nicknamed 'martinets.' The College of the Sorbonne (founded in 1250) was commonly regarded as identical with the theological faculty, because the members of the one were most frequently members of the other also. The promotions however continued to be made by the officers of the university, although the charge of education had been in a great measure engrossed by the colleges. Degrees were conferred in the faculties of theology, canon law, and medicine, by the deans, with the concurrence of the chancellor of the Cathedral of Notre Dame; in the faculty of artists, by the rector, with the concurrence either of the chancellor of Notre Dame or the chancellor of St. Geneviève.

The oldest authentic document bearing upon the University of Bologna is the privilege granted by the emperor Frederic I., at Roncaglia, in November, 1158, to all who travel in pursuit of learning, in which the professors of law are mentioned in terms of high encomium. Bologna is not named in this instrument, but history mentions no other law-school as existing at that early period. The contents of this privilege are twofold: foreign scholars are declared to stand under the emperor's immediate protection, and a special jurisdiction (their teachers, or the bishop of the city) is constituted to judge in all complaints against them. It seems universally admitted that the earliest teacher of civil law at Bologna was Irnerius: he is said to have been originally a teacher of philosophy, but to have acquired such a knowledge of Justinian's compilations that he was invited by the Countess Matilda to expound its doctrines from the professorial chair. Matilda died in 1115: between 1113 and 1115 the name of Irnerius appears in a legal document as 'causidicus' for the countess. From 1116 to 1118 he appears to have been employed in weighty missions by the emperor Henry V. Under the emperor Frederick 'the four doctors' of Bologna were selected to investigate the rights of the crown, in order to determine how far those claimed by the Lombard towns were usurpations. These circumstances show that the reputation for legal knowledge acquired by the law-teachers of Bologna had proved an introduction to state employments, honours, and emoluments; and this attracted the city in which they taught a large concourse of the most intelligent and aspiring minds of Europe. The reputation of having studied at Bologna was a passport to office throughout Christendom. The earliest statutes and charters of the University of Bologna are compacts entered into by the students for mutual support and assistance, and immunities granted them by the popes and emperors. The University of Paris was originally an association of teachers; it was a corporation of graduates: the University of Bologna was originally an association of students who had repaired from distant lands to avail themselves of the instruction of a few celebrated teachers; it was a corporation of students. Disputes between the magistrates of the city, and between the students and professors, which occurred about 1214, are the first occasions on which we hear of a rector. From the history of these controversies it appears that the students had previously been in the habit of electing the rector, and that the right was confirmed to them for the future. At first there was merely a school of law in Bologna, and the jurists constituted the university, or rather the two universities of the Citramontani and Ultramontani. In course of time teachers of philosophy and medicine settled in Bologna, and the scholars of each class attempted to form a university: their right to do so was successfully contested by the jurists in 1295, but in 1316 they were allowed to elect a rector of their own. They called themselves 'philosophi et medici,' or 'artistae.' In 1362 Innocent VI. founded a school of theology at Bologna. From this time therefore there were four universities in Bologna: two of law (which however were so intimately connected, that they are generally spoken of as one), one of medicine and philosophy, and one of theology. Each of these had its own independent constitution. That of the law university is best known, and agrees in its leading features with the others. The 'universities' consisted of the foreign students, who were admitted upon the payment of twelve soldi entry-money, and obliged to renew annually their oath of obedience to the rector and the statutes of the university. The Bolognese students could neither hold offices in the university nor vote in its assemblies. The foreign students were divided into Citramontani and Ultramontani: the former were divided into seventeen nations, the latter into eighteen. The rector was chosen annually from among the students by his predecessor in office, the rector's council, and a number of electors chosen by the nations. A rector was taken from each nation in rotation. The council consisted of at least one representative of each nation: some had two. The university also elected annually a syndic, to act for them in courts of law; a notary; a massarius, or treasurer (chosen from among the town bankers); and two bidelli. The rector claimed exclusive jurisdiction in all civil cases in which one or both of the parties were students, and in criminal cases in which both were students. The professors were elected by the students, to whose body they were reckoned, and all whose privileges they enjoyed, except a vote at elections. They stood under the jurisdiction of the rector, who could fine or suspend them. The degree of Doctor was conferred by those who had previously obtained it: it was held to confer the privilege of teaching everywhere, the power of discipline over the doctor's own pupils, the right to take part in the conferring of all the degrees. At first there were only doctors of civil law: the doctors of canon law appear later, and were long less respected. In the thirteenth century the university began to create doctors of medicine, of grammar, of philosophy and arts, and even of the notarial art. Any student who had studied five years might be licensed by the rector to expound a single title, or, if he had studied six years, to expound a whole book of the Pandects. He was termed a licentiate; and after he had performed his task, he was declared a baccalaureus. Salaried professors appear in Bologna for the first time about 1279. The doctors taught in their own houses or in halls hired for the purpose: their method of tuition was by lectures, examinations, and disputations.

The history of the university of Salerno is much more obscure than the histories of the universities of Paris and Bologna. Ordericus Vitalis, whose annals close with the the year 1141, speaks of Salerno as a place long eminent for its medical schools. Its most celebrated teacher, Constantine of Carthage (died 1087), was a privy councillor of Louis Guiscard. This school was still flourishing in 1224, when the university of Naples was established. All that can be inferred from these scanty notices of the school of Salerno is, that the scientific study of medicine was making rapid strides about the same time that law began to be more systematically studied, and philosophical and literary pursuits to be regarded as the profession of a class whose members might or might not be priests.

A sense of the advantages of general knowledge had led to the foundation of cathedral and cloister schools; a sense of the use of accomplished professional men led to the encouragement of the philosophical and theological schools of Paris, the law school of Bologna, and the medical school of Salerno. The peculiar constitution of society and government at the period led to the peculiar form of incorporation adopted by the schools of Paris and Bologna. The same social necessities were working under the influence of similar social organization in many different places, and must necessarily have led, even without communication, to similar results. But quarrels which broke out repeatedly between the universities of Paris and Bologna and the civil authorities of these cities, induced the teachers and students at different times to emigrate in a body and settle in other towns. After the breach was healed, they returned, but in some instances celebrated teachers preferred remaining in their new place of settlement, and in others the government created a new university after their temporary visitors had left them. Other universities owed their foundation to the desire of princes, ecclesiastics, or municipal authorities to disseminate learning; and others to a desire on the part of these authorities to procure for their territories a share in the wealth diffused by the resort of numerous foreigners to any celebrated school. Under the influence of motives so various, the growth of universities throughout Europe was rapid. Before the Reformation they were established in Italy, France, the Germanic Empire, the Peninsula, Great Britain, and even among the Sclavonic nations east of the Germans. The universities established in Italy previous to the year 1500 were, besides the three already named:—Vicenza, A.D. 1204; Naples, 1224; Padua, 1228; Piacenza, 1248; Arenza, 1255; Perugia, 1290; Macerata, 1290; Cesena, year uncertain; Rome, 1303; Pisa, 1308; Siena, 1350; Pavia, 1361; Ferrara, 1391; Palermo, 1394; Cremona, 1413; Florence, 1438; Catania, 1445. In France, besides Paris:—Toulouse, 1233; Montpellier, 1180; Orleans, before 1236; Lyon, before 1290; Vienne, uncertain; Perpignan, 1340; Angers, 1364; Aix, 1400; Dole, 1426; Caen (founded by the English government under Henry VI.), 1433; Bordeaux, 1441; Valence, 1452; Nantes, 1463; Bourges, 1464. Within the limits of the Germanic Empire, which then extended over many provinces now incorporated into France, and over the Netherlands:—Prague, 1348; Vienna, 1365; Heidelberg, 1387; Cologne, 1388; Basle, uncertain; Erfurt, 1392; Leipzig, 1409; Rostock, 1419; Louvain, 1426; Greifswalde, 1456; Freiburg, 1457; Trier, 1472; Ingolstadt, 1472; Tübingen, 1477; Mayence, 1477. In Great Britain:—Oxford, before 1149; Cambridge, uncertain; St. Andrews, 1412; Glasgow, 1454; Aberdeen, 1494. In Spain and Portugal:—Salamanca, 1240; Coimbra (originally established in Lisbon), 1290; Valladolid, 1346; Huesca, 1354; Valenzia, 1410; Siguenza, 1471; Saragossa, 1474; Avila, 1482; Alcala, 1499. In the Baltic States:—Upsala, 1476; Copenhagen, 1479.

In all of these institutions we recognise the leading features of Paris or Bologna. All of them, apart from the consideration of their academic character, are privileged corporations, with an independent jurisdiction more or less limited, and the power of making bye-laws. In most of them the division of the members of the corporation into nations prevails. In all of them the faculties of philosophy (or arts), theology, law (civil and canon), and medicine, are more or less fully developed. Some contain within them all the faculties; some only two or more. Almost all have a faculty of arts, which, even where it is politically the most powerful (as in the university of Paris), is regarded as in a great measure preparatory to, and therefore in its scientific character inferior to the others. In the universities of spontaneous growth the privilege of conferring degrees appears to have been claimed only in those faculties which were completely organized; in the factitious universities created by governments, the right of bestowing degrees in all faculties appears to have been claimed, even where some of them only were completely organized. In some of these bodies the students constituted the corporation; in others, the masters or teachers: the former appear to have assimilated themselves to the model-university of Bologna; the latter, to that of Paris. The Italian universities, and the greater part, if not all, of the French universities, except Paris, were corporations of students. The Parisian institutions were adopted in England, the Germanic Empire, and the states on the Baltic. Spanish universities have the appearance of being a compromise between the two principles: in Salamanca the rector was elected by the scholasticus of the cathedral from among the students, and the rector appointed the professors and fixed their salaries. This division of the old universities into two classes appears, like everything about those institutions, to have had its origin in the social necessities of the time and countries. The legal faculty predominated in the Italian universities, and the French universities were called 'universités des loix.' The universities of this type will be found to predominate in those countries in which the Roman law prevailed, as contradistinguished from Teutonic Germany and England, and the 'pays coutumiers' of France—in the countries in which the old Roman civilization had never been entirely extirpated, as contradistinguished from those in which the Teutonic invaders formed the majority of the population. In the former there was a civilization apart from the church; in the latter there was no civilization but what came through the church. In the former a secular and independent spirit prevailed: the universities were incorporations of grown men seeking secular learning. In the latter a spirit of clerical domination prevailed: the universities were corporations of teachers seeking to exercise the functions of missionaries.

The universities founded after the beginning of the Reformation adopted the great outlines of the organization of their predecessors: the political incorporation, the privileged jurisdiction and power of making bye-laws, the faculties and modes of conferring degrees which custom had established. But the altered circumstances of society modified considerably their external relations. The territorial divisions of Europe had come to be more sharply defined, and the authority of the sovereign to be more energetically enforced by more perfect civil and military organization. The day of feudal lords, of municipalities and other privileged corporations, each standing upon his or its defence, and acknowledging a limited and precarious subjection to the nominal liege was past; the day of great states, of territorial governments, had come. The same political power could not and would not be conceded to universities that had formerly been given to them. The old were restricted in their privileges; the new never received them. The protracted strife between the Romish and Protestant churches also had its effect: universities, though no longer allowed to lay down the law, were cherished as advocates of a party. Roman Catholic and Protestant universities were erected to do battle for their respective creeds. Lastly, other sciences had had their practical utility recognised, in the same way as the sciences of law and medicine had had theirs at an earlier period. The applications of mathematical science to the purposes of war and navigation had given an impetus to their cultivation: these new practical pursuits never produced a new faculty, but they lent greater importance to the miscellaneous faculty known as the faculty of arts.

The number of universities founded in Europe, from the time of the Reformation down to the French Revolution was considerable. In Italy:—Messina, 1548; Fermo, 1589; Mondovi, 1600; Parma, 1601; Cagliari, 1606 (re-established in 1764); Mantua, 1625; Urbino, 1671; Turin, 1725; Camerino, 1727; Sassari, 1765; Milan, 1766; Genoa, 1783. In France:—Rheims, 1558; Douay, 1561; Besançon, 1564; Pont-à-Mousson, 1572; Strasbourg, 1623, Corte (in Corsica) after 1700. In Germany:—Wittenberg, 1502; Frankfort (on the Oder), 1506; Marburg, 1527 (and again in 1653); Königsberg, 1544; Dillingen, 1549; Jena, 1558; Helmstädt, 1576; Altdorf, 1578; Olmütz, 1581; Würzburg, 1582; Grätz, 1586; Giessen, 1607; Paderborn, 1615; Rinteln, 1621; Salzburg, 1623; Osnabrück, 1630; Münster, 1631; Pesth (originally at Tyrnau, thence transferred first to Ofen, and afterwards to Pesth), 1635; Linz, 1636; Bamberg, 1648; Herborn, 1654; Duisburg, 1655; Inspruck, 1672; Halle, 1694; Breslau, 1702; Göttingen, 1734; Fulda, 1734; Erlangen, 1743; Clausenberg, 1775; Bonn, 1778. In the United Provinces:—Leyden, 1575; Franecker, 1585; Harderwyck, 1600; Groningen (uncertain); Utrecht, 1634. In Great Britain:—Edinburgh, 1582; Aberdeen (Marischal College), 1593; Dublin, 1591. In Spain and Portugal:—Seville, 1504; Toledo, 1518; Compostella, 1532; Baeza, 1533; Gandia, 1549; Ossuna, 1549; Almagro, 1552; Orihuela, 1552; Oviedo, 1580; Ebora, 1600, Onate, 1600. In the Baltic States:—Kiel, 1665; Lund, 1668; Abo, 1640; Dorpat, 1632 (transformed to Pernau in 1699). In Poland:—Vilna, 1597; Krakau, 1632. In Russia:—Kiew (in the 17th century); Moskau, 1755.

Many events concurred during this period to lower universities in the public estimation. The extension of elementary and secondary schools had raised the standard of education among the classes which did not receive a university education. The invention of printing, increasing the facilities of private study, had operated in the same direction. The diminished privileges and restricted jurisdiction of universities had brought them to be regarded merely as schools of a higher order. The increasing number of learned societies raised up a body of non-academical literati, hostile in many instances to the academical; and the public, looking only to the transactions of these societies, forgot that their members were indebted for their training to the universities. The presumptuous spirit of amateur dabblers in science undervalued these institutions; and, in the feverish spirit of innovation which occasioned or accompanied the French Revolution, they too were denounced. In France the old universities have entirely disappeared. In the rest of Europe, as soon as the storms of the Revolution were passed over, they revived; and adapting themselves more to the social necessities of the age, have in many instances started with increased energy on a fresh career of utility. An account of the present condition of the Universities of Oxford, Cambridge, and some others of the more important, will be found in the articles devoted to the towns in which they are situated: here the limits of a work like this admit of no more than a list of existing universities, with the numbers of their students and professors up to the latest period for which authentic information has been obtained.

ITALY.

		Students.
The two Sicilies	Catania (1840) .	300
	Messina . .	..
	Naples (1840) .	1365
	Palermo (1840) .	400
Papal States .	Bologna (1840) .	680
	Camerino (1840) .	150
	Ferrara (1840) .	150
	Macerata . .	..
	Perugia (1840) .	200
	Rome (1840) .	460
	Urbino . .	200
Tuscany . .	Florence (1840) .	200
	Pisa (1840) . .	450
	Siena (1840) .	259
Sardinia. . .	Cagliari (1840) .	240
	Genoa (1840) .	450
	Sassari (1840) .	240
	Turin (1840) .	811
Parma . . .	.. (1840) .	410
Modena . . .	.. . .	..
Austrian Italy .	Mantua . .	..
	Padua (1840) .	410
	Pavia (1840) .	1300

THE PENINSULA.

		Students.
Spain . . .	Alcala . .	304
	Cervera . .	573
	Granada . .	812
	Huesca . .	537
	Onate .	270
	Orihuela . .	124
	Oviedo . .	420
	Palma . .	177
	Salamanca . .	418
	Saragossa (1828) .	1165
	Santiago (1828) .	1050
	Seville . .	807
	Toledo . .	257
	Valencia (1828) .	1550
	Valladolid (1828) .	1248
Portugal . .	Coimbra . .	1609

FRANCE.

The phrase 'Royal University of France' is almost equivalent to that of 'national system of education in France.' The governing body is the council of public instruction, of which the minister of public instruction is the president. All educational institutions, from elementary schools upwards, are, with half-a-dozen exceptions, under the direction of this body. Under the councillors are inspectors-general of the university, whose office it is to examine all schools and colleges once a year. The educational functions discharged by Universities in other nations of Europe are vested in twenty-six academies, each of which has a territory of two or more departments allotted to it. At the head of each academy are a rector, two inspectors, and a council: they have the superintendence over all the schools in their districts. The academy includes the faculties; but all the faculties are not organized in every academy, and some have none. There are six faculties of Roman Catholic theology,—at Aix, Bordeaux, Lyon, Paris, Rouen, Toulouse: and two of Protestant theology, one Lutheran, at Strasbourg, and one Calvinistic, at Montauban, under the academy of Toulouse. There are nine faculties of law,—at Aix, Caen, Dijon, Grenoble, Paris, Poitiers, Rennes, Strasbourg, and Toulouse. There are three faculties of medicine,—at Grenoble, Paris, and Montpellier, with seventeen secondary schools of medicine. And there are seven faculties of literature,—Paris, Strasbourg, Bordeaux, Toulouse, Caen, Dijon, and Besançon. The faculties consist of a variable number of professors, one of whom is dean, and a committee of whom examine candidates for degrees. The students sufficiently advanced to study the sciences taught by the faculties are instructed in royal colleges, and are classified according as they reside within or without the walls. The academies are:—

	Royal Colleges.	Professors.	Students.	
			Within the walls.	Without the walls.
Aix . . .	1	14	160	230
Amiens . .	1	12	121	180
Angers . .	1	12	118	110
Besançon . .	1	12	110	160
Bordeaux .	1	13	170	120
Bourges . .	1	12	129	120
Caen . . .	1	15	212	290
Cahors . .	2	22	90	160
Clermont . .	3	42	289	292
Dijon . . .	1	13	88	150
Douai . .	1	12	131	110
Grenoble . .	1	14	133	141
Limoges . .	1	11	88	220
Lyon . . .	1	20	276	264
Metz . . .	1	15	190	240
Montpellier .	2	23	199	256
Nancy . .	1	14	110	260
Nîmes . .	3	39	365	266
Orleans . .	2	24	241	286
Paris . . .	7	180	1629	3324
Pau . . .	1	12	57	90
Poitiers . .	1	15	130	201
Rennes . .	3	33	346	407
Rouen . .	1	17	164	491
Strasbourg .	1	14	121	203
Toulouse . .	1	15	112	239

GREAT BRITAIN.

Oxford (resident members in May, 1842) .	1613
Cambridge (resident members in Nov., 1840) .	1754
London	
Durham	
St. Andrews	
Glasgow	
Aberdeen	
Edinburgh	
Dublin	

GERMANY.

		Professors.	Students.
Austria*	Grätz (1828) . .	..	321
	Innspruck (1828) .	..	352
	Lemberg (1833) .	..	1311
	Olmütz (1833) . .	..	682
	Pesth (1834) . .	..	1610
	Prague (1825) . .	55	1449
	Vienna (1838) . .	77	2620
Prussia	Berlin (1838) . .	94	1776
	Bonn (1838) . .	57	828
	Breslau (1838) . .	47	951
	Greifswald (1838) .	28	216
	Halle (1838) . .	53	844
	Königsberg (1838)	37	430
Bavaria	Erlangen (1840) .	34	325
	Münich (1840) . .	71	1440
	Würzburg (1840) .	31	447
Baden	Freiburg (1840) .	35	315

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* With the exception of its Italian universities, given above.

May and terminates at the end of July. The subjects of instruction were to be treated more extensively than it had been the practice to treat them; and Comparative Anatomy and Pathological Anatomy were for the first time made subjects of courses of lectures in a London school of medicine. All persons above the age of fifteen years were to be admitted without restriction or examination to any of the classes.

The remuneration of the professors was made to depend on the fees paid by the students who entered their classes. A certain amount however, varying according to circumstances, was guaranteed to them for the first three years. If the amount of fees exceed a certain sum, a portion is retained by the college towards defraying the expenses of the establishment.

The omission of the subject of theology from the courses of study in the proposed new University had from the first given rise to much discussion, and it was eagerly seized as a pretext for affixing a stigma on the project, by representing it as a plan to found a University on the principle of indifference to religion; and it was urged against its claims to support, that no system of education in which theology was not comprised would be complete. But it was considered a sufficient answer to these charges, that the institution was intended for the instruction of students as laymen only; to give an education for the ministers of religion as such was no part of the founders' scheme: for young men designed for the Church of England, Oxford and Cambridge existed already, and were sufficient; and to agree on a system of theological instruction for ministers of various denominations was obviously impossible. That the omission of religious instruction was not owing to indifference, appeared from the fact that an earnest but not very judicious attempt to reconcile the introduction of instruction in theology with the principle of the institution—the admission of all classes without the distinction of creed—was the subject of anxious deliberation; and a proposal was at one time entertained and nearly adopted, to give theological instruction in three classes, viz. theology by a member of the Church of England, ecclesiastical history by a member of the Church of Scotland, and Biblical criticism by a member of one of the dissenting congregations. But the impracticability of such an arrangement was foreseen, and it was wisely abandoned. The determination not to be biassed by the imputations of their adversaries was the more readily acquiesced in by the many zealous supporters of the London University, who, differing in their modes of worship, agreed in the sincerity of their religious opinions, from the consideration that since it was not proposed to found a College in which young men should reside, but rather a Hall in which they should meet during a certain portion only of every day to receive instruction, it might be safely and properly left to the parents and guardians of students to provide for their religious education and devotional exercises.

It happened indeed that although the most strenuous advocates of the University were found, as was to be expected, among the leading members of the liberal party in politics, headed, as in other recent cases of popular measures which had the extension of education for their object, by Lord Brougham (then Mr. Brougham), and well supported by the most enlightened classes of dissenters, yet the list of contributors to the funds for founding the institution comprised persons, members of the peerage as well as others, of so many various parties, and so considerable a proportion of those who subscribed most largely were men of rank and members of the Church of England, that their names and well-known opinions were sufficient evidence that the aims of the founders were of a catholic, and not of a sectarian or party character. The number of persons who became shareholders was about eleven hundred, and the sum for which they subscribed was upwards of one hundred and sixty-one thousand pounds. The amount of donations was two thousand three hundred and fifty pounds. The number of students who had entered the classes during the first year were five hundred and fifty-seven. Of these two hundred and sixty-nine were for branches of general education, one hundred and twenty-three attended the law classes only, and one hundred and sixty-nine were medical students. The number in the second year amounted to five hundred and ninety-six, but the proportions had varied: the entries to the law classes had diminished, while those of the medical school had risen to two hundred and fifty-six, and there was an increase in the classes in literature and the sciences.

It will not here be out of place to mention, that as soon as the efforts of its friends had succeeded in raising capital enough for the establishment of this institution, another College, precisely similar in its nature, excepting that it contained classes for instruction in the tenets of the Established Church, was founded in the Strand, under the name of King's College, London, and under the auspices of the bishops and clergy of the Church of England.

In the year 1830 an application was made to the crown for a charter of incorporation for the University of London. In the year 1825 indeed a bill had been introduced into the House of Commons with a view to incorporate the proprietors by act of parliament, but an objection having been raised that it could only pass as a private bill, it had been allowed to drop. The charter as prayed for had gone through nearly all its usual forms, when its progress was stayed by the opposition of the Universities of Oxford and Cambridge, and no further proceedings towards its completion were taken until the year 1833, when the application was renewed, and the petition of the Council of the University was on this occasion seconded by an address to the throne from the city of London. It was again opposed by the two old Universities, but new adversaries had also taken the field: these were the Royal College of Surgeons of London, and the teachers of medicine and surgery in the hospitals of the metropolis, with other members of the Faculty. The matter was referred to the Privy Council, before whom the case was argued during three days in the months of April and May, 1834. All the opposing parties agreed in one objection to the granting of this charter. It was considered that the conferring on the new institution the title of *University* would invest it with the privilege of granting degrees, as incidental to that title, and against its possessing this privilege they all protested, but the grounds on which their opposition was based differed. The petition presented to the king by the University of Oxford expressed the alarm of that body 'that serious injury would accrue to numerous antient institutions, and much consequent evil to the public, if a right to confer any academical distinctions designated by the same titles or accompanied with the same privileges as the degrees of the Universities of Oxford and Cambridge should be given by royal charter, either expressly or by implication, to a society which had no immediate connection with the established church, and taught no system of religion.' In the argument before the Privy Council it was maintained by their advocate that the king could not grant the charter prayed for: first, because the University would necessarily be subject to visitation by the archbishop of Canterbury, and such visitation was not compatible with the existence of an institution in which the doctrine of the Church of England was not taught. To strengthen this view of the case, not only was the charge against the proposed University of indifference to religion strongly urged, but its supporters were reproached with inculcating infidelity: they do not teach religion, it was argued; therefore they teach no religion; therefore they teach infidelity. Secondly, to grant the charter would be contrary to law—a violation of some of the statutes of the land, and especially of the Act of Uniformity, which required that the Book of Common Prayer should be used by all who officiate in chapels and halls in *both* the universities; and thirdly, the charter could not be granted consistently with the coronation oath, by which the king is bound to uphold the church establishment. The petition of the University of Cambridge was silent as to the grounds on which its objections to the London University conferring degrees were founded, but these were stated in the arguments of their counsel to be, the want of security that the degree would be properly conferred by a body which, without due authority, had assumed a name to which the privilege is attached. It was urged in support of the prayer against the granting of the charter, that it would be derogatory to the dignity of the crown to sanction by royal authority that which in its commencement was a delusion. The joint-stock character of the association of subscribers to the institution was also objected against it; and it was contended that the motive for desiring to confer degrees was to enhance the market value of the property. The medical and surgical opponents of the charter, both in their petitions and through their counsel, alleged the danger of injury to their interests as teachers, from the advantage over them which would be enjoyed by the University of London as a school of medicine, if it should receive the power of conferring degrees.

The Oxford objections were easily disposed of: the reply to the reproach for the want of instruction in theology has been anticipated. To the others it was answered:—first (and this proposition was assented to by the Privy Council as indisputable), that a university is a lay corporation, and is not, as a corporation, visitable by the archbishop of Canterbury; secondly, that it was mere casuistry to construe the expression in the Act of Uniformity, '*both the universities*,' to mean all universities that should ever be constituted; and thirdly, that the view taken of the coronation oath was an exploded party sophism which had been treated on several occasions as an absurd fallacy, both by the crown and the legislature. The Cambridge objection, reiterated indeed by all the petitioners against the charter, of the joint-stock character of the association, was met by a reference to the list of subscribers, and to the fact that the benefit of the shareholders was limited to the receipt of 4 per cent. interest on the sum subscribed by them, in case, which was a remote possibility, a fund should arise out of which such interest could be paid. It was reasonably asked, whether this fact, together with the character of the persons who subscribed, and the amount of their subscriptions, was not sufficient evidence that no spirit of mercantile speculation had prompted the undertaking, but that the contributions were to be viewed in the light of an advance of money on loan, not for gain's sake, but for the attainment of an important national object. Guarantees were offered for securing the proper conferring of academical distinctions. The objections peculiar to the College of Surgeons and medical teachers having practically more weight,—touching indeed the so-called vested interests of the petitioners, were not to be set aside so readily. It could not be denied that the institution of the medical school of the University had operated somewhat injuriously to the pecuniary interests of the teachers in the hospitals and other schools of the metropolis: it might be true that its example had put them to the inconvenience of introducing some new regulations for the improvement of medical education generally, and perhaps had imposed on them the necessity of a greater degree of personal exertion than formerly: it could not be denied that the number of students attending the old schools had been reduced, in consequence, in the first place, of the mere entrance into the field of competition of a new school; and in the second, of the preference shown by a large proportion of the young men who were preparing for the practice of medicine or surgery as a profession, for the system of instruction adopted at the University: it was certain that the proportion of University medical students to the whole number of pupils resorting to the twelve schools of London was about one-fifth; that, as compared with particular schools, that of the university was the largest in point of numbers in London, and exceeded by one-half that which stood next to it. The medical professors of the University indeed, impressed with these facts, and aware that the possession by the University of the power of granting degrees in medicine might be considered as placing the other schools of the metropolis under disadvantage, were desirous that the claim to grant medical degrees should be waived; but on the part of the University generally a different view of the question was taken. One of the objects of the founders was to make London a school of medicine worthy of the advantages for such a purpose, which, as a large capital, it presented; and this object would not be accomplished unless, with the means of giving a complete education to the medical student, there existed the power of bestowing on him the usual academical distinctions. To the objections of the College of Surgeons it was answered, that their privileges would not be interfered with; that their diplomas would be sought as before as certificates to the qualification of a due *professional* education merely; while the degree of the University would only be conferred on those who, besides their medical education, had attained a liberal amount of knowledge in the other arts and sciences; and that for this degree the University possessed three great essentials not to be found united in any other school in England, namely, competent means of instruction in Arts, complete arrangements for teaching the Medical Sciences, and opportunities of Clinical Instruction: the great hospitals wanting the first; the Universities of Oxford and Cambridge being deficient in the last.

After the hearing by the Privy Council of the petitioners for and against the charter, the consideration of the matter was adjourned, and before any decision was pronounced a change in the administration took place. Sir Robert Peel succeeded Lord Melbourne as prime minister in November, 1834, and the question remained in the same position until March, 1835. On the 26th of that month a motion was made in the House of Commons by Mr. W. Tooke for an address to the King praying that a charter of incorporation might be granted to the University of London, containing no other restriction than against conferring degrees in divinity. This motion was carried against the ministry by a majority of 110 members: the ayes being 246, the noes 136. The reply of the King was to the effect, that the Privy Council should be called on without delay for a report of the proceedings in the matter, in order that his Majesty might be enabled to judge what might be the best mode of carrying into effect the wishes of his faithful Commons, and what might be the conditions with which the grant of a charter to the University of London ought to be accompanied.

After this vote in their favour by the House of Commons some months elapsed, and yet no charter had been granted. In the mean time Lord Melbourne and his friends had been restored to power. At length, in August, 1835, Mr. Spring Rice, then Chancellor of the Exchequer, acting for the ministry, who were pressed by the Council of the University to give effect to the vote of the Commons and the promise of the King, communicated to them a proposal to incorporate by charter as a University in London a body of gentlemen of eminence in learning and science, who should have the power of examining candidates and of conferring degrees in Arts, Medicine, and Laws, on students of certain Colleges in London therein named, and others existing throughout the country to be afterwards recognised, as well as the schools of professional education. This university was to be supported by an annual vote of money by Parliament, and the degrees were to be conferred on persons of all religious persuasions without distinction, and without the imposition of any test or disqualification whatever. At the same time a charter was to be granted to the then existing University as a College, and it was to be recognised in the charter to the University as one of the schools entitled to send up students for examination.

This proposal was accepted without hesitation both by the Council and the proprietors at large of the University, to whom it appeared calculated to accomplish, even more comprehensively than the founders of the institution itself had hoped for, the ends they had in view. They therefore readily abandoned all claims to exclusive consideration which they might be held to derive from the vote of the House of Commons in their favour. In carrying this scheme of a University consisting of a Board of Examiners distinct from the Institutions for Education, the government received effective assistance from Mr. Warburton, who had been a member of the Council of the University from its foundation. The Professors also lent their cordial aid to the plan.

The proposal was carried into effect in the following year. In November the great seal was put to a charter creating a University of London, of which a further account is given under UNIVERSITY OF LONDON. Previously, but on the same day, namely, November 28, 1836 (7 Will. IV.), this institution, after an existence of eleven years under the name of 'The University of London,' had received a royal charter of incorporation as a college, with the title of 'University College, London,' for the purpose, as expressed in the charter, 'of the general advancement of literature and science, by affording to young men adequate opportunities of obtaining literary and scientific education at a moderate expense.' In the mean time the course of instruction had been steadily continued by the College, and the classes in the several faculties had arrived at the points at which, with slight fluctuations, they have since remained. At the end of the three years from the opening of the College, the guarantees to the professors ceased, and the income accruing from the portion of fees reserved to it being found inadequate to defray the annual expenses, the place of Warden, to which an income of 1200*l.* a year was attached, was resigned by Mr. Leonard Horner, who held that office, and was abolished. T sum paid as guarantees to the professors had amounted in 1834 to about 6300*l*. In the year 1832 a plan had been adopted for the improvement of the constitution of the University. A Committee of Management of the Council, consisting of six members, was appointed for conducting the ordinary business of the college, and the professors were divided into three faculties, with the intention that there should be a dean at the head of each. That plan having been embodied in the bye-laws under which the College is at present governed, there is no need of saying more of them here. (In January, 1832, an elementary school for the education of boys under the age of fifteen, with a view to prepare students for the College, and to improve the opportunities of education for the children of residents in its neighbourhood, had been established within the building, and placed under the professors of Latin and Greek as head-masters.

In 1834 an hospital erected on part of the ground belonging to the College, by public subscription, chiefly among the proprietors, at the cost of about 10,000*l*., had been opened, for the purpose of affording the medical students clinical instruction under the superintendence of the professors.

After the acceptance of the charter, no material alteration took place in the academical arrangements, or in the numbers attending the classes. During the seven years which terminated with the end of the session 1842, the average number of students had been as follows: in Arts and Laws, including 16 for the latter, 145; in Medicine, 430. The receipt for fees of students during the seven years had been 61,393*l*., of which 46,115*l*. were for the Medical classes, and 15,279*l*. for the classes in Arts. In Arts the highest number in any one year has been 156 (1839); the lowest 119 (1837). In 1842 the number was 154. The attendances on the most essential classes have varied during the seven years as follows: Mathematics, between 54 and 91; the last year (1842) the number was 73: Natural Philosophy, 29 to 58; the last year 49: Latin, from 44 to 77; the last year 66: Greek, from 46 to 70; the last year 68. In the Medical Faculty the greatest number of students in any one year has been 497 (1838); the lowest 238 (in the last year). The proportion to the other Medical schools in the metropolis, speaking generally, has been uniformly maintained, and the decrease is accounted for by the fact that a great diminution in the number of medical students throughout the country has taken place. The number of the boys in the junior school are nearly 400 in the course of a year; the numbers in attendance at any one time varying from 300 to 340. In August, 1842, they were 335. The fact that since the opening of this Institution upwards of 184,000*l*. has been received by it in the shape of fees for education, affords satisfactory evidence of a public demand for such an establishment.

The ordinary annual expenses of the establishment, not including the payment to professors and teachers, amount to about 3500*l*.; the portion of the fees of college-students and school-pupils taken by the council generally amounts nearly to that sum.

Endowments.—An endowment made to the college in 1836 by Mrs. Mary Flaherty has enabled the Council to establish four annual scholarships of 50*l*. a year for four years, of which one is awarded every year to the best proficient in mathematics and classical learning alternately. The sum placed at the disposal of the Council by this benefactress was 5000*l*. three and a half per cents., and was expressed to be given 'out of zeal for the diffusion of knowledge and the advancement of civil and religious liberty, and in the firm conviction that this cause will in the end be triumphant.' With the accumulations of dividends, which accrued while the question as to the best application of this fund was under consideration, and the addition of somewhat more than 200*l*. by the Council, a fund yielding 200*l*. per annum was created.

A second endowment enjoyed by the college is of the value of 3000*l*. Consols, received at various times, from a benefactor under the title of 'Patriot.' It is placed at the disposal of Lord Brougham, who has applied the dividends to the maintenance of classes by the professors of Latin, Greek, Mathematics, and Natural Philosophy, for the instruction of schoolmasters of unendowed schools and of ushers, on the payment of a trifling additional fee. Attendance on these classes for two years is a qualification to be a candidate for degrees at the University of London. The number of attendants on this class is usually between thirty and forty. This employment of the funds was adopted on the recommendation of Lord Brougham.

The College is entitled to other endowment-funds, only a small portion of which is yet in actual possession, to the amount of about 36,000*l*.

The CONSTITUTION OF THE COLLEGE, as now regulated by the charter, and bye-laws made in pursuance of it on the 7th of May, 1842, is as follows:—The government of the college is vested in five bodies: 1, General Meetings of the Members of the College (in other words, of the founders of the institution, and the representatives of founders); 2, the Council; 3, the Senate; 4, the Faculty of Arts and Laws; 5, the Faculty of Medicine.

General Meetings.—The members of the college who constitute the general meetings are proprietors and donors. Proprietors are the holders, for the time being, as original subscribers, or representatives of original subscribers, of existing shares in the College—shares on which the full sum of 100*l*. has been paid. Proprietors with the title of *Fellows* may be created by the Council by conferring certain shares at their disposal on students of the College who shall have taken a degree with honours at the University of London, in the proportions of two-thirds of the shares so conferred in one year among the graduates in arts or laws, and one-third among the graduates in medicine. Donors are persons who have given to the College 50*l*. in one sum. The number of existing shares (January, 1843) is 1610; that of individual subscribers for those shares, 1072; that of donors, 38; of members of the College (total of donors and proprietors), 1110. The General Meetings have the power of making bye-laws and regulations respecting all the affairs and concerns of the college; and they elect the President, Vice-President, Treasurer, and other members of Council, and the Auditors. Their decision of questions is by the majority of votes of members present. The mode of voting, except at elections, is by show of hands, and, if that be doubtful, by division. No business, except the election of officers, and the reading the annual report of the council, and the annual account of the auditors, can be transacted unless thirty members be present. There must be one General Meeting every year, for choosing the President, Vice-President, Treasurer, and Members of Council; and at this meeting, on the last Wednesday in February, the Report of the Council of the proceedings of the College during the previous year and the account of the auditors are read. Special General Meetings may be convened by the Council. It is imperative on them to convene such special meetings on receiving requisition so to do in writing, signed by twenty members of the College, also in cases of vacancy in certain essential offices. The President, Vice-President, Treasurer, and six members of Council and one Auditor at least, are elected every year by ballot from among the members of the College. The President, Vice-President, Treasurer, and Councillors of the immediately preceding and other former years are re-eligible. The members of Council who are to vacate, in case of the election of new members, are, previously to the election, determined by the Council by ballot. Any member of the College giving due notice, and also the Council, may nominate candidates for all the offices to be filled up. The Council are required to nominate in cases in which the members of the College fail to do so; but of the six members of the Council to be named by the Council, not more than three can be selected from those appointed to vacate. One Auditor at least, and as many more as may be necessary to make up the full number of four, must be elected every year. If the number be complete, the Auditors themselves, and in their default the Council, appoint one of the number to vacate, and the person so appointed to vacate is not re-eligible for the ensuing year. Members of the Council and Auditors ceasing to be members of the College, or deriving emolument from the College, vacate their offices. A member of Council cannot be an Auditor. A professor or holder of any place of emolument in the College, if elected to a seat in the Council, or to be Auditor, must vacate his former office if he do not resign his new one. No person while a member of Council or Auditor, nor for two years afterwards, can be appointed to a professorship, or other place of emolument in the College.

The Council consists of the President, Vice-President, Treasurer, and twenty-one other members. The number of the latter is limited to twenty-four, but must not be less than sixteen. Five are a quorum. The Council has the superintendence and management of the College, with power to regulate the teaching of the various branches of literature and science; to determine the times of opening and closing the academical sessions yearly, and the times and length of the vacations: subject to certain regulations, to institute professorships, lectureships, and teacherships, and to appoint and remove professors, tutors, and other instructors; to accept gifts and endowments for promoting particular objects of education, or for general purposes; and to manage and dispose of the income and property of the college, except that without the consent of a general meeting no alienation or mortgage of the real estate can be made. Of gifts and endowments special accounts are to be kept, distinct from the other funds of the College. A session of Council is held once a month; but the ordinary business is transacted by a Committee of Management, which meets every fortnight or oftener, and consists of six (not more than seven) members chosen by the Council by ballot out of their own body, and the President of the Senate: three are a quorum. All communications from the College to the government, or to the University of London, are made by or through the Council.

The Senate was created by the General Meeting, in exercise of the power to pass bye-laws, for the purpose of better regulating the academic business of the College, and of the better maintenance of discipline. It was first established by the proprietors in the year 1832. It consists of the professors of the College, with a President and two Vice-Presidents. The President is chosen annually by the professors by ballot from three members of Council, who are selected by ballot by the Council, and presented to the professors for their choice. The President appoints two other members of the Council to be his Vice-Presidents. The President or a Vice-President and six professors are a quorum for ordinary purposes. The President has only a casting vote. The Senate determines, subject to approval by the Council, the times of commencing the several courses of lectures, the length of the courses, and the days and hours of instruction: it exercises jurisdiction over professors, lecturers, teachers, and students. No professorship nor teachership can be instituted or discontinued, and no professor appointed by the Council, until the respective matters have been submitted to the consideration of the Senate: it also determines, subject to the approval of the Council, to what faculty the professor of a newly-appointed professorship shall belong.

The Faculties.—The Faculty of Arts and Laws consists of the professors of Latin; Greek; English; French; Italian; Hebrew; Arabic, Persian, and Hindostani; Sanscrit; Chinese; Comparative Grammar; History; Political Economy; Philosophy of the Mind and Logic; Jurisprudence; English Law; Mathematics; Natural Philosophy and Astronomy; Architecture; Civil Engineering; Chemistry; Zoology; Botany; and Geology. The head master of the junior school is also a member, *ex-officio*, of the Faculty of Arts. The Faculty of Medicine consists of the professors of Anatomy and Physiology; Anatomy and Practical Anatomy; Pathological Anatomy; Comparative Anatomy; Medicine; Clinical Medicine; Surgery; Clinical Surgery; Midwifery; Materia Medica; Chemistry; Botany; and Medical Jurisprudence. Each faculty is presided over by a dean, chosen by its members, by ballot, from among themselves. The Dean acts as chairman and secretary to his faculty. For transacting ordinary faculty business the Dean and two professors are a quorum, if the faculty consists of less than nine professors; if of more than nine, the Dean and three professors are a quorum. Each faculty has a limited jurisdiction over its own members, over the lecturers and masters made subject to it, and over the students entered to the classes of the respective professors and teachers. Each faculty makes regulations, subject to approval by the Council, for the examination of the classes of the professors and teachers subject to it, and may appoint persons, in addition to the professor or teacher, to examine any class.

Professors, Lecturers, and Teachers.—Before a professorship, lectureship, or teachership is filled up by the Council, the names of the candidates, with their testimonials, must be communicated to the Senate; and the Council can make no appointment until a report of the Senate shall have been made, or the time for making such report, which the Council may limit to a fortnight, shall have expired. In emergencies the Council may appoint a temporary substitute for a professor without consulting the Senate. The Senate must likewise be consulted before the Council can exercise the power of instituting a new or of discontinuing an existing professorship, or of appointing any person to deliver an occasional course of lectures. A professorship becomes forfeited if the holder be proved, to the satisfaction of the Council, to have paid or agreed to pay a retiring allowance to a professor. On such occasions the Committee of Management of the Council have to investigate the case, and report their opinion on it to the Council. In other cases, whether of unbecoming conduct or of neglect of duty, a professor cannot be removed from his professorship, except after report by the Committee of Management to the Council of the facts of the complaint brought against him, and their opinion that he ought to be removed. Previously to making such report the Committee must have investigated the complaint, and, if the party so require, have referred it for investigation to the Senate, and waited a fortnight for the report of that body; or the Senate must in the first instance have investigated the complaint by a quorum of half their body, and reported the facts and their opinion on them to the Committee. The Council must be convened to consider the report of the Committee by seven days' notice, and a majority, consisting of not less than nine, of the members present and voting on the question, must have voted that the professor be removed. The professors are besides responsible to their respective faculties, to the Senate, to the Committee of Management and to the Council, and subject to admonition from either of those bodies; but the Council and Committee before dealing with a case of complaint against a professor must refer it, if required, to the Senate for investigation and report.

Discipline.—The general maintenance of order among the students of the College is committed to the Senate, subject to the control of the Council; but the students are amenable also in various degrees to the professors individually, the Faculties, the Senate, and a Court of Discipline. Every professor, lecturer, or teacher has the power of suspending a student from attendance on his class for disorderly conduct in the class-room; and if he reports the case to the Faculty, before the next meeting of the class, the student remains suspended until the Faculty, Senate, or Court of Discipline has dealt with the case. A committee, consisting of the professors of Latin, Greek, Mathematics, and Natural Philosophy, may, on the report of the professor of any of those classes, call a student of either of them before it, admonish him, or suspend him for seven days from attendance on all or either of the classes. The Senate and Faculties have the power of punishing a student for disorderly conduct, either in a class-room or in other parts of the College or its precincts, by suspension from attendance on classes; the Faculties, for the whole or part of the then current quarter of a year; the Senate, for the remainder of the academical session. The Senate may moreover exclude students from competition for prizes, certificates of honor, or scholarships.

The Court of Discipline consists of the Committee of Management and the Deans of the Faculties. It has the power of inflicting the same punishments as the Senate, and moreover that of expulsion from the College. Three members of the Committee of Management and the two Deans are a quorum, except for the purpose of expulsion: when such a case is to be considered, the court must be specially convened, and six members must be present, the presiding member having a casting vote; the non-attendance of any member and the reasons for his absence must be recorded.

The Junior School of the college is under the control of Council, and conducted by a head master appointed by them. The appointment of all the assistant masters rests with him; he has the rank and privileges of a professor in the College, and holds his office by the same tenure as a professor.

The Government of the Hospital is conducted under regulations made by the Council of the College, by a General Committee annually appointed by the Council, and a Medical Committee consisting of the Medical Faculty of the College and the Physicians and Surgeons of the Hospital. The fees received from hospital pupils, which amount to sums varying from 2500*l.* to upwards of 3000*l.*, are applied have passed the Matriculation Examination. 3. Have been students during two years at one or more of the medical institutions or schools recognised by the University, subsequently to having taken a degree in arts or passed the matriculation examination. 4. Have attended a course of lectures on each of four of the subjects in the following list:—(Z) Descriptive and Surgical Anatomy; General Anatomy and Physiology; Comparative Anatomy; Pathological Anatomy; Chemistry; Botany; Materia Medica and Pharmacy; General Pathology; General Therapeutics; Forensic Medicine; Hygiene; Midwifery and Diseases peculiar to women and infants; Surgery; Medicine. 5. Have dissected during nine months. 6. Have attended a course of Practical Chemistry, comprehending certain specified practical exercises. 7. Have attended to Practical Pharmacy sufficient time to have acquired a practical knowledge in the preparation of medicines.

The examination is in Anatomy; Physiology; Chemistry; Structural and Physiological Botany; Materia Medica and Pharmacy, with an examination in Anatomy, if practicable by dissection and demonstration. A subsequent examination for honours takes place: to this no student is admissible if he have completed his 22nd year. The examination is on the following subjects:—Anatomy and Physiology, in which answers may be illustrated by sketches; Chemistry; Materia Medica, and Pharmaceutical Chemistry.

The Second Examination for the degree of B.M. takes place once a year, and commences on the first Monday in November. The candidate must have passed the first examination two years at least previously. He must produce certificates—1. Of having subsequently to the first examination attended a course of lectures on each of two of the subjects comprehended in the list (Z) above given, for which he did not present certificates at the first examination. 2. Of having subsequently to the first examination dissected during six months. 3. Of having conducted at least six labours. 4. Of having attended the surgical practice of a recognised hospital or hospitals during twelve months, and lectures on chemical surgery. 5. Of having attended the medical practice of a recognised hospital or hospitals during other twelve months, and lectures on clinical medicine. 6. Of having subsequently to the completion of his attendance on surgical and medical hospital-practice, attended to practical medicine in a recognised hospital, infirmary, or dispensary during six months.

Certificates will be received on the subject of midwifery from any legally qualified practitioner, and on the subject of practical medicine from the same, if he have the care of the poor of a parish. The candidate must produce a certificate of moral character from a teacher in the last school or institution at which he has studied, as far as the teacher's opportunity of knowledge has extended. The examination is on the following subjects:—Physiology, including questions in Comparative Anatomy; General Pathology; General Therapeutics; Hygiene; Surgery; Medicine; Midwifery; Forensic Medicine. In the first week, by printed papers; in the second, by *vivâ voce* interrogation. Subsequently an examination for honours takes place on the following subjects:—Physiology and Comparative Anatomy (in which the answers may be illustrated by sketches); Surgery; Medicine; Midwifery; Structural and Physiological Botany.

M.D.—This examination takes place once a year, and commences on the fourth Monday in November. The candidate must have taken the degree of Bachelor of Medicine in the University, or a degree in medicine or surgery at a University, the degrees granted by which are recognised by the Senate; in the latter case he must produce also a certificate of having completed his 23rd year. He must produce certificates of having attended subsequently to having taken one of the above degrees in medicine (*a*) to Clinical or Practical Medicine, during two years in an hospital or medical institution recognised by the University, (*b*) or to Clinical or Practical Medicine during one year in an hospital or medical institution recognised by the University; and of having been engaged three years in the practice of his profession, (*c*) or if he have taken the degree of B.M. in the University, of having been engaged during five years in the practice of his profession (one year of attendance on clinical or practical medicine, or two years of practice are dispensed with in the case of candidates placed in the first division at the second examination for B.M.). He must also produce a certificate of moral character signed by two persons of respectability. The examination is conducted by *vivâ voce* interrogation as well as by papers. The subjects of examination are—Elements of Intellectual Philosophy, Logic, and Moral Philosophy; Medicine. The examination for honours is on the subjects of Surgery; Medicine; Midwifery.

For degrees of medicine, both B.M. and M.D., candidates who commenced their medical studies in or before January, 1839, and practitioners in medicine and surgery, are admitted to examination on modified terms.

Mode of Examination.—The examinations are by printed papers, but the examiners may put *vivâ voce* questions upon the written answers when they appear to require explanation. On the pass examination for Matriculation, and for the degrees of B.A., B.L., B.M., and M.D., the candidates who have passed are to be arranged in two divisions, each in an alphabetical order; but in the medical examinations such candidates only as are admissible to the examination for honours are placed in the first division. Candidates for honours must have passed the previous examinations; and as to the medical examinations, they must have been placed in the first division. After the examination for honours in the respective subjects, and also in the pass examination for the degree of M.A., the candidates who have acquitted themselves to the satisfaction of the examiners are to be arranged according to their several subjects in the order of proficiency: equals are to be bracketed; and in determining the relative position of the candidates, except in the subjects of natural history, the examiners are to have regard to the proficiency evinced by the candidates in the pass examination. After the examination in the *Old* and New Testament and scripture history, the candidates are to be divided into three classes according to proficiency, and alphabetically arranged in each class. Every examiner is to be present during the time that the candidates are engaged in writing answers to the questions set by him. Every member of the Senate and examiner may be present during the *vivâ voce* examinations, but only the examiners specially appointed to conduct the examination can put questions. All the examiners to whom *vivâ voce* examination is intrusted must be present during the whole time of such examination.

Fees.—The fees for examination, and which are returnable if the candidate does not pass, are as follows:—Matriculation, 2*l.*; B.A., 10*l.*; M.A., 10*l.*; B.L., 10*l.*; LL.D., 25*l.*; B.M.,—first examination 5*l.*, second examination 5*l.*; M.D., 10*l.*; Certificates of Proficiency in Architecture, &c., 10*l.* if the candidate have taken the degree of B.A. in the university; otherwise 20*l.*

Scholarships and Rewards.—Candidates for degrees who, in the examination for honours in the respective classes of subjects, or in the pass examination for the degree of M.D., shall have most distinguished themselves, if in the opinion of the examiners they shall possess sufficient merit, may receive the following rewards:—

Matriculation: *Mathematics; Classics.*—In each an exhibition of 30*l.* a year for two years, or during so much of that time as the exhibitioner shall continue a student in one of the institutions connected with the University.

In *Chemistry* and *Natural History* respectively, a book prize of 5*l.* value.

B.A. Degree: *Mathematics; Classics.*—Each 50*l.* a year for the next three years, with the style of University Scholar.

Chemistry; Animal Physiology; Vegetable Physiology; and Structural Botany—respectively; a prize in books of 5*l.* value.

M.A.: each of the three branches.—A gold medal of the value of 20*l.*

Scripture Examination.—To each candidate placed in the first class, a book of 5*l.* value.

B.L.: *Jurisprudence.*—50*l.* per annum for the next three years, with the style of University Law Scholar.

LL.D.—A gold medal of the value of 20*l.*

B.M.: First Examination.—*Anatomy* and *Physiology; Chemistry; Materia Medica*, and *Pharmaceutical Chemistry.*—Each, an exhibition of 30*l.* a year for two years. A gold medal of the value of 5*l.* to the first and second candidate in each subject.

B.M.: Second Examination.—*Physiology and Comparative Anatomy; Surgery; Medicine.*—Each, 50*l.* per annum for two years, with the style of University Medical Scholar.

Also in each of those subjects a gold medal of the value of 5*l*. to the first and second candidate.

M.D.: Pass Examination.—*For the best commentary on a case in* Medicine, Surgery, Midwifery,—each a gold medal of the value of 5*l*.

For *a thesis* on a subject of the candidate's own choice, a gold medal of the value of 10*l*.

Examination for Honours: *Surgery; Medicine; Midwifery*,—each a gold medal of the value of 5*l*.

EXAMINERS.—Classics, two; Intellectual Philosophy, Logic, and Moral Philosophy, two, one of whom is an examiner in Classics; Political Philosophy and Political Economy, one; Mathematics and Natural Philosophy, two; Chemistry, one; Botany, one; French Language, one; German Language, one; Scriptural Examination, two; Anatomy and Animal Physiology, two; Materia Medica and Pharmacy, one; Midwifery, one; Surgery, two: Medicine, two; Laws, one. Of these seven only are Members of the Senate. The examiners receive salaries, the amount of which, subject to the approbation of the government, is fixed by the Senate.

The expenses of the University were, during the year 1840-41, 5061*l*.; the fees received of graduates were 783*l*. In 1841-42 the expenses were 5287*l*.; the fees, 988*l*. The loss to the country therefore in each year was about 4300*l*. A reduction has been made in the salaries of examiners, &c., and the probable future expenses will be, for examiners and officers, 3370*l*.; for exhibitions, scholarships, medals, and prizes, 1000*l*.; printing and other contingencies, 700*l*.: total, 5070*l*.—deducting 600*l*., estimated amount of fees in future, 4470*l*.

The Senate holds its sitting in Somerset House, in apartments formerly occupied by the Royal Academy. The earl of Burlington, appointed Chancellor by the original charter, still holds that office. Mr. Lubbock, now Sir J. W. Lubbock, was the first Vice-Chancellor, and continued to be elected to that post until June last, when, having resigned, Mr. John G. Shaw Lefevre was chosen as his successor, and now fills the office. The executive officer of the Senate is the Registrar.

The institutions empowered to issue certificates to candidates for degrees in Arts and Laws of the university are:—University College, London; King's College, London; St. Cuthbert's College, Ushaw; Stoneyhurst College; Royal Belfast Academical Institution; Bristol College; Manchester New College; St. Mary's College, Oscott; Carlow College; St. Edmond's College, near Ware; Homerton Old College; Highbury College; Colleges of St. Peter and St. Paul, at Prior Park, near Bath; Spring Hill College, Birmingham; Stepney College; College of St. Gregory the Great, Downside, near Bath; Countess of Huntingdon's College, at Cheshunt; Baptist College, at Bristol; Airedale College, Undercliffe, near Bradford; Protestant Dissenters' College at Rotherham; Presbyterian College at Caermarthen.

The medical institutions and teachers recognised by the University are—King's College, London; University College, London; the principal hospitals, several private schools, in all seventeen, in London. Two in Birmingham; three in Bristol; the Hull and East Riding of York school; the Leeds School, Liverpool; the school attached to the Royal Institution; the Royal Manchester School of Medicine and Surgery; the Newcastle-upon-Tyne School of Medicine and Surgery; the Sheffield Medical Institution; the York School of Medicine. In Scotland:—the University of Edinburgh, and six other schools; in Glasgow, the Portland-Street School of Medicine, the Andersonian Institution, and the College-Street Theatre of Anatomy. In Ireland:—fourteen schools of medicine in Dublin; four in Cork; and the Belfast Academical Institution. Also the University of Malta; and the Military Hospital in the Island of Ceylon.

The regulations of the University in full detail are printed in separate publications for each Faculty, and from these the particulars above given have been derived.

UNLAWFUL ASSEMBLY. [RIOT.]

UNLIMITED. This term is frequently used by mathematical writers, in the same manner as INDEFINITE, to avoid the entrance of the word INFINITE. It is also used to describe a problem which may have an infinite number of answers, and which is called an unlimited problem.

UNNA, a town in Prussia, in the government of Arnsberg, in the province of Westphalia, is situated on the little river Kottelbeck, in 51° 33′ N. lat. and 7° 40′ E. long. It is surrounded with a rampart and ditch, and has one Roman Catholic church and 4416 inhabitants. There are considerable breweries, brandy-distilleries, and a manufactory of earthenware.

(Müller, *Wörterbuch des Preussischen Staates*.)

UNO'NA, a genus of the natural family of Anonaceæ, so called from *unus*, 'one,' the stamens being united with the germens. The generic character is, sepals, 3; petals, 6, the three inner the smallest; stamens numerous; carpels numerous, one or many celled; many seeded, seeds in a single row. The species consist of trees, large shrubs, or climbing plants, found in hot parts of the world, as India and its islands, Africa, and South America. The bark and fruit of many of the species are aromatic, with some degree of acridity, and are employed as stimulating medicines or as condiments. *U. Æthiopica*, a native of Ethiopia and Sierra Leone, is a tree with ovate lanceolate leaves, which are also acute, smooth, and have the under surface glaucous; it has roundish, torulose, nearly sessile carpels. It has obtained more celebrity than other species, from being supposed to be that which yields the seeds formerly well known under the name of Ethiopic pepper, the *filfil-al-Soudan* of Arabian authors. They have been also called Guinea pepper and Negro pepper, in consequence of their having been employed as a substitute for that condiment by the negroes, from their aromatic and pungent taste. They must not be confounded with the Amomum Granum Paradisi, obtained also from the west coast of Africa. *U. aromatica*, another species, which is a native of or introduced by the negroes into Guiana, is however considered by some to be the species yielding the Negro pepper. It has oblong, acuminate, and smooth leaves; peduncles axillary, 1 to 2 flowered; carpels oblong, terete, torulose, nearly sessile. Every part of the plant is aromatic, and the fruit is used as a condiment by the negroes of Guiana. *U. undulata*, a native of Waree in Guinea, has aromatic fruit similarly employed. *U. Narum* is one of the climbing species, a native of Malabar, which Rheede describes as possessed of medical properties, the roots being so used, as well as a sweet scented greenish-coloured oil obtained from them by distillation. *U. musaria* has been so called from its bark being used for making musical instruments, as is indeed also that of the foregoing species. This is a rambling shrub, a native of Amboyna, &c.; the roots and bark are also used medicinally. *U. tripetala*, *uncinata*, *odorata*, &c., natives of the Indian islands, are remarkable for the sweet scent of their flowers. *U. esculenta*, a native of the Indian peninsula, has fruit which is edible. Some species, as *U. sylvatica*, are valued for their timber. *U. longifolia* is an elegant tree, with smooth, pointed, and undulate leaves, which is much cultivated in some parts of India to form avenues and to afford shade. It is sometimes called Deodara, which is properly the name of the celebrated Himalayan Pine, Pinus or Cedrus Deodara.

UNST. [SHETLAND, ISLES OF.]

UNTERWALDEN, a canton of Switzerland, and one of the three Waldstätten which began the Helvetic Confederation, is bounded on the north by the Waldstätter See, or Lake of the Four Cantons, which separates it from Schwyz and partly from Luzern, on the west by Luzern, on the south by the Bernese Oberland, and on the east by the canton of Uri. The area of Unterwalden is about 275 square miles. It consists mainly of two great parallel valleys, each about 15 miles in length, running from south to north, and terminating on the southern coast of the Waldstätter See. The eastern valley is drained by the Engelberg Aa, a torrent which rises in the Surenen Alps on the borders of Uri, flows by the abbey of Engelberg, and enters the lake below Stanz. The western valley is drained by the Sarner Aa, the outlet of the little Alpine lake of Lungern, at the foot of the Brünig, near the borders of the Bernese Oberland, and which, after passing through the lake of Sarnen, enters a bay of the Waldstätter lake below Alpnach. The lower part of the eastern valley constitutes the district called Nidwald, or 'below the forest,' and the western valley, with the upper part of the eastern valley, forms the district called Obwald. These denominations relate to the Kernwald, or forest of Kerns, which lies on the borders of the two districts. The Obwald and Nidwald have formed two separate communities ever since 1150. They both joined Schwyz and Uri in the insurrec tion of 1308, and when the first federal union was entered into at Brunnen, in December, 1315, Obwald and Nidwald were recognised as forming together one canton, by the name of Unterwalden. They retained however their separate existence as independent communities, but figured as only one canton, having one vote in all federal affairs, and this arrangement has continued in force to this day.

Unterwalden is surrounded, except on the north side, by offsets of the Alps, which detach themselves from the great central group of the St. Gothard, and divide the basin of the Aar from that of the Reuss. One branch runs along the southern border of the canton, separating it from the Bernese Oberland. The pass of the Jochberg leads from Meyringen in the Oberland to Engelberg and Stanz, and the pass of the Brünig leads from Brienz to Sarnen. Another ridge runs along the eastern parts of Unterwalden and divides it from Uri, forming the summits of the Titlis (10,500 feet above the sea), and of the Wallenstock and Rothstock, each above 8000 feet. Lastly, another offset of minor elevation runs along the western border of Unterwalden, dividing it from the canton of Luzern. Mount Pilatus (about 7000 feet) is the highest summit of this last offset. In the interior of Unterwalden there are no very high mountains, but the surface of the country consists chiefly of hills and terraces, several valleys, and some tracts of plain bordering on the Waldstätter lake. The Unterwalden is chiefly a pastoral country; the pastures are mostly natural. There are about 12,000 cows, 3000 sheep, 6000 goats, 3500 pigs, but very few horses. About 20,000 cwts. of cheese are annually made. The cheese of Unterwalden, of the first or best sort, is much esteemed in Switzerland and Italy. The canton abounds with fruit-trees; little wine is made, and that of a very inferior quality. The honey is excellent. The canton imports corn, wine, salt, manufactures, and colonial articles; it exports cattle, cheese, butter (which is sent chiefly to Luzern), timber, and hides. The canton is not favourably situated for trade, being confined between the Alps and the lake, with no high road passing through it, and none but mountain-passes leading out of it. By the census of 1835 the population was 23,600, of whom 13,120 were in the Obwald, and 10,480 in the Nidwald. All the native inhabitants, who are of age, with the exception of a few heimathlosen, who have no political rights, are members of the landsgemeinde of their respective district, Nidwald or Obwald. Each of these two small republics sends a deputy to the federal diet, but their votes, when in accordance, count only for one vote, and if discordant, they of course neutralize each other. Each has its own landamman, its landrath,—in short, its whole administration similar to that of the other small democracies of Switzerland, for which see Schwyz. There is no printed code, but a MS. collection of laws, which, together with custom, serve to regulate the judicial proceedings. In 1835 there were as yet no prisons: serious offences are punished by fines, corporal punishment, and in certain cases by death. Each of the two divisions of the canton has an hospital and a poorhouse. A dialect of the Swiss-German is the language of the country. The Roman Catholic is the religion of the whole canton. The Benedictine monastery of Engelberg, whose abbot was once lord of the valley of that name, is more than 3000 feet above the sea: it is a foundation of the eleventh century. It has a library of 20,000 volumes, and several valuable MSS., a collection of medals, engravings, armorial ensigns, and a grammar-school.

The principal towns or villages are—1, Sarnen, the head town of the Obwald, on the northern extremity of the lake of the same name, has a fine town-house, with historical portraits of Nicholas von der Flüe, Anderhalden of Melchthal, who was deprived of sight by order of the governor appointed by Albert of Austria previous to the insurrection of 1308, and of the series of the landammans of Obwald. Sarnen has also a college, a theatre, an hospital, a poorhouse, a public school, several churches and convents, and above 1000 inhabitants. The arsenal of Obwald is on the hill called Landenberg, where was once the castle and residence of the Austrian governors. 2, Kerns, on the Melcha, an affluent of the Aa, and on the road from Sarnen to Stanz, is a pretty village, with a handsome church and tower, several iron-works, mills, and a cotton-spinnery. 3, Stanz, the head town of the Nidwald, situated in a fine plain at the foot of mountains, has a splendid parish church with a noble dome, and a fine square before it, with two fountains, and a statue of Winkelried, the hero of Sempach. The convent of the Capuchins has a considerable library. The town-house contains several paintings, among others one of Nicholas von der Flüe. The arsenal was plundered by the French in 1798, when the greater part of the population was massacred. The population of Stanz itself is about 1200; that of the parish exceeds 4500. Stanzstad, which is the port of Stanz, on the banks of the lake of the Waldstätter, is two miles from the town, and carries on considerable trade by water.

The canton of Unterwalden is one of the most interesting districts of central Switzerland, on account of its historical recollections, and also because the inhabitants, owing to their remote locality, have retained more perhaps than those of any other canton their old simplicity of manners and pastoral habits. It has also produced some distinguished men, such as the engineer Müller of Engelberg, who died in 1833, and has left several maps in relief of the mountain cantons, the painter P. M. Deschwanden, the sculptor J. Christen, the organist J. Durrer of Beckenried, and others, besides a number of military officers, either in the service of their own country or in that of foreign states. At present Unterwalden furnishes several companies to the Swiss regiments in the pay of Naples and the pope.

(Leresche, *Dictionnaire Géographique de la Suisse.*)

UPAS. [Antiaris.]

UPLAND. [Sweden.]

UPPERMAL. [Hindustan, xii., 214.]

UPPINGHAM. [Rutlandshire.]

UPSA'LA is a town in Sweden, situated in the province of Upland, and in the Län which bears its name, in 59° 51′ N. lat. and 17° 30′ E. long. It lies in an extensive undulating plain, probably less than 300 feet above the sea-level. The town is rather small: the population, according to Forsell, in 1839 did not exceed 4800 individuals; but it extends over a great area, as there are large gardens to most of the houses. The houses are partly of stone and partly of wood, and mostly two stories high. The streets are wide and straight, especially those which terminate in the spacious square which occupies the centre of the town. The cathedral was erected between 1258 and 1435, and is considered the finest Gothic building in the north of Europe. In this church monuments have been erected in memory of many distinguished persons, among which are those of Gustavus I. and of Linnæus. Formerly the kings of Sweden were crowned in this cathedral. The square in which the church stands is surrounded by buildings belonging to the university: there is a library, containing nearly 100,000 volumes, a collection of coins, an anatomical theatre, an observatory, a chemical laboratory, and a very extensive collection of natural objects. There is also a botanical garden. A great number of distinguished naturalists have been professors at this university. Among the most eminent are Waller, Bergman, Linnæus, Scheele, and Berzelius. The university was established in 1478, but received its present constitution and a regular income from Gustavus and from Charles Gustavus Adolphus, who are considered as its real founders. The number of regular professors amounts to twenty-four, and that of adjunct professors to fourteen. They all have a fixed salary, either in corn or calculated according to the price of that commodity. The salary of the adjunct professors is only about one-third of that of the regular professors. The number of students who attend the lectures varies between 800 and 1000, but there are usually 400 or 500 more on the books, as many students interrupt their studies by entering some rich family as private tutors, and in this way they procure the means of pursuing their studies with more leisure and better success. The university and its studies are modelled on the German universities, but, by some prudent arrangement, the pernicious effects of the societies among the students which are felt in nearly every university of Germany have been avoided. The Society of Sciences, which was instituted in 1719, has published several volumes of 'Transactions,' which contain valuable researches. There are in Upsala a grammar-school, two elementary schools, and several other charitable institutions. There is also a society for promoting agriculture. Many persons belonging to the class of gentry in North Sweden pass the winters in Upsala, on account of the pleasant society which is created by so many well-instructed persons. About six miles south-east of Upsala are the *mora-stones*, at which the electors met for the purpose of choosing their king when Sweden was an elective kingdom (1140-1520).

(Schubert's *Reise durch Schweden, Norwegen, Lapland, &c.*; Forsell's *Anteckningar Ofver Sverige*; and *Journal of Education*, vol. viii.)

UPTON-UPON-SEVERN. [WORCESTERSHIRE.]

U'PUPA. [UPUPIDÆ.]

UP'UPIDÆ, a family of INSESSORES, or *Perching Birds*.

Linnæus placed the genus *Upupa* between *Merops* [BEE-EATER] and *Certhia* [CREEPER], among his *Picæ*, in his last edition of the 'Systema Naturæ:' the species of *Upupa* recorded by him are *epops*, *promerops*, and *paradisea*.

Lacépède arranged the genus under his *Passereaux*, between *Glaucopis* and *Certhia*, in that division which includes the Passerine Birds with a bent bill (Bec arqué).

Duméril's *Tenuirostres*, or *Leptoramphes*, form the last family of his order *Passereaux*, and *Upupa* is placed at the end of that family.

Meyer arranges *Upupa* between *Oriolus* and *Cuculus*, in his second order, *Coraces*.

Illiger's *Tenuirostres* form the third family of his *Ambulatores*; *Nectarinia*, *Tichodroma*, and *Upupa* are the genera comprised under that family.

Cuvier makes *Upupa* the last genus of his *Tenuirostres*, placing it immediately after the *Colibris* (*Trochilus*, Linn.). Cuvier's *Upupa* comprises the following subgenera:—*Fregilus*, Cuv.; the Hoopoes, properly so called (*Upupa*); *Promerops*; and *Epimachus*.

Upupa and *Promerops* are arranged by M. Vieillot in his second order, *Sylvicolæ*, and in his second tribe (*Anisodactyli*) of that order, among his *Epopsides*, the twenty-third family of his *Sylvicolæ*, which stands between the *Anthomyzi* and the *Pelmatodes*.

M. Temminck also gives *Upupa* a place among his *Anisodactyles*, and in his 'Manual of European Birds' arranges it next to *Tichodroma*.

In the method proposed by M. de Blainville, and carried out by M. Lherminier, the *Epopsides*, with the genus *Upupa* for the type, form the seventeenth family of the first subclass, or 'Normal Birds,' and stand between the Woodpeckers (*Picus*) and the *Passeres*.

Mr. Vigors, who places the *Promeropidæ*, with a note of interrogation, as one of the three aberrant families of the TENUIROSTRES, remarks that the genus *Promerops*, Briss., appears to be that form of the tribe which approaches nearest to the FISSIROSTRES. Retaining the slender bill of the *Tenuirostres*, it exhibits, he observes, somewhat of the broad base of the bill of the *Fissirostres*, and, at the same time, their gressorial feet. By means of *Merops*, the curved bill of which approaches the structure of its own, it appears, he says, to be immediately connected with that group; but of the limits of this family he was unable to say anything when he wrote. (*Linn. Trans.*, vol. xiv.)

Mr. Swainson arranges the 'subfamily' (family) *Promeropidæ* between the *Trochilidæ* and the *Paradisiadæ*. The following is his character of the 'Promeropidæ, *Hoopoes*:'—

Feet syndactyle; the outer toe united for half its length to the middle; bill very long, greatly compressed.

The following genera are comprised under this family—*Promerops*, Briss.; *Upupa*, Linn.; and *Epimachus*, Cuv. (*Classification of Birds*.)

The Prince of Canino (*Birds of Europe and North America*) places the *Upupidæ* between the *Alcedinidæ* and the *Trochilidæ*.

In 1840 M. Le Baron de la Fresnaye read to a meeting of the Zoological Society of London his observations on the situation which the genus *Upupa*, in his opinion, should occupy in the classification of birds, judging from the form of the feet and from the habits of the species.

The following is a translation of this author's observations:—

'It is surprising, now it is generally known that the classification of species and genera based solely upon the form of the beak is often unnatural and vicious, that modern authors should have continued to unite, as did the old authors, the genus *Upupa* with that of *Epimachus* or *Promerops*, and that they should constitute with these genera a little family under the name of *Promeropidæ*.

'It is evident that authors have been guided solely by the structure of the beak in such an association; and if the feet of these genera be compared, we are struck with the enormous difference which exists in their conformation, and consequently, of necessity, with the habits of the species.

'The Hoopoe, in fact, in the shortness of its fore-toes, in the almost straight form of the claws, and particularly in the claw of the hind-toe, we perceive has evident affinities with the Larks (*Alauda*) and other conirostral ground-birds. Like them also, the Hoopoe seeks its food on the ground, and especially on humid and newly disturbed land. It is often seen in grazing-lands, where it seeks its food in the excrement of cattle, in which coprophagous insects abound. Its long and very slender beak is well adapted for pulling out the larvæ of these insects from the small holes in which they live and undergo their transformations: it serves well likewise to divide and disperse the excrement when dried by the sun.

'It is seen that the Hoopoe, with its feet formed like those of the Larks, also essentially resembles those birds in its cursorial habits, but that it seeks its nourishment only on the ground, and in humid lands, such as pasture-land.

'If, on the other hand, we consider the form of the feet of the species of *Promerops*, with which the Hoopoe is usually associated, it will be seen that there exists a very essential difference in these organs. The feet of the *Promerops* are as remarkable for their thickness as those of the Hoopoe (though fitted for walking) are for their slenderness. In the first of these genera the toes are strong; the external toe is elongated as well as the back toe, as in all those birds which are essentially perchers and which procure their food upon trees, whether it be in the manner of the species of *Melliphaga*, *Paradisea*, or *Dendrocolaptes*.

'As in these genera likewise, the claws in *Promerops* are very strong and much arched. The birds of this genus, in fact, appear to us to be *Cinnyridæ*, but on a large scale.

'The genus *Upupa*, as at present constituted, consists only of two or three species,—one from Europe, an African species, and one from India: in these there is so great a similarity in form, colouring, and habits, that upon a cursory view they might be mistaken for one species.

'This genus therefore does not, as in most other genera, present certain species which recede from the type and form a transition between it and other genera, with which it is then natural to group them.

'From these considerations the genus *Upupa* appears to us to be one of those isolated genera, like many others in the class, which cannot be naturally placed in any other group, but which ought to be regarded as constituting by itself a family or subfamily, under the name of *Upupidæ* or *Upupinæ*, its situation being in the section *Tenuirostres*; and if it be only regarded as a subfamily, it is with another subfamily of the cursorial *Tenuirostres* it should be grouped, which division should contain the genera *Upucerthia* of M. Isidore Geoffroy St. Hilaire, and some other genera peculiar to Chili, described by Killitz and by Mr. Gould in the 'Voyage of the Beagle,' and the species of which, in the form of their beak and feet, as well as in their cursorial habits, afford a positive analogy with our genus *Upupa*, from which the genus *Promerops* is so isolated.' (*Zool. Proc.*)

Mr. G. R. Gray makes the *Upupidæ* (*Upupa*, Linn.), the first family of the *Tenuirostres*, consist of the following subfamilies and genera:—

Subfam. 1. *Upupinæ*.

Genera: *Upupa*, Linn.; *Fregilupus*, Less.; *Falculia*, J. Geoffr.; *Neomorpha*, Gould; *Seleucides*, Less.; *Craspedophora*, G. R. Gray; *Ptiloris*, Sw.

Subfam. 2. *Promeropinæ*.

Genera: *Promerops*, Briss.; *Rhinopomastus*, Smith; *Epimachus*, Cuv.

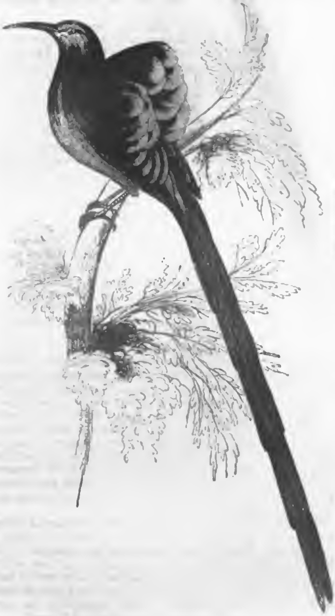
The *Upupidæ*, in Mr. Gray's arrangement, are immediately succeeded by the *Nectariniidæ*.

Our limits will not permit us to notice particularly in this article more than the genera *Upupa*, *Promerops*, and *Epimachus*.

Upupa. (Linn.)

Generic Character.—Bill very long, slightly arched, slender, triangular, compressed; nostrils basal, lateral, ovoid, open, surmounted by the feathers of the forehead; feet with three anterior toes; the external joined to the middle toe up to its first joint; one posterior toe; claws short and slightly curved, that of the hind-toe nearly straight; tail head and the belly lustrous also with steel-blue, &c. In truth language fails to convey any just idea of the magnificence of this species: we shall, however, let Sonnerat, who figures the bird, and who wrote in 1776, speak for himself.

'There does not perhaps exist,' says Sonnerat, 'a more extraordinary bird, or one more aberrant from the idea after which Nature has wrought in this genus, than the Grand Promerops of New Guinea. It is four feet in length from the extremity of the bill to that of the tail. Its body is delicate, slender, and, although it is of an elongated form, appears short and excessively small in comparison with the tail. To add to the singularity of this bird, Nature has placed above and below its wings feathers of an extraordinary form, and such as one does not see in other birds: she seems, moreover, to have pleased herself in painting this being, already so singular, with her most brilliant colours. The head, the neck, and the belly are glittering green; the feathers which cover these parts have the lustre and softness of velvet to the eye and to the touch; the back is changeable violet; the wings are of the same colour, and appear, according to the lights in which they are held, blue, violet, or deep black, always however imitating velvet. The tail is composed of twelve feathers, the two middle are the longest, and the lateral ones gradually diminish: it is violet or changeable blue above, and black beneath. The feathers which compose it are as wide in proportion as they are long, and shine both above and below with the brilliancy of polished metal. Above the wings, the scapulars are very long and singularly formed; their barbs are very short on one side and very long on the other. These feathers are of the colour of polished steel changing into blue, terminated by a large spot of brilliant green, and forming a species of tuft or appendage at the origin of the wings. Below the wings spring long curved feathers directed upwards. These are black on the inside, and brilliant green on the outside. The bill and the feet are black.' (*Voyage à la Nouvelle Guinée.*)



Epimachus magnus. Grand Promerops.

Locality.—M. Lesson states that he procured several individuals of this beautiful species on the coasts of New Guinea, where it appears to be common.

URAGUAY. [BANDA ORIENTAL.]

URAL is the name of a river which runs along the eastern boundary-line of Europe, and divides it from Asia. It originates in the Southern Ural, at the foot of Mount Kalyan, near 53° N. lat., at an elevation of 2132 feet above the sea-level. It first runs south about 200 miles in a straight line to the fortress of Orskaya, where it turns to the west, in which direction it passes south of the town of Orenburg, and continues to flow about 300 miles in a straight line to the fortress of Uralsk. Near this place it again turns to the south, and reaches in that direction the Caspian Sea after a course of 300 miles, measured in a straight line. The whole course of the river, when its numerous windings are included, probably does not fall short of 900 miles, and may exceed that amount. It may be compared as to its length with the Rhine. The first [illegible] miles it runs in a narrow valley, between the principal chain of the Ural Mountains, the Ural Tau on the west, and the Ilmenes Mountains on the east. The last-mentioned chain sinks down to the level of the plain south-east from Verkh-Urask, where the level of the river is still about 1248 feet above the sea, and where it begins to be navigable for small boats. South of Verkh-Urask the Ural flows along the eastern base of the table-land of Sakmara, and on the east of it extend the steppes of the Kirghises. At Orskaja, where the river turns westward, its level is about 550 feet above the sea. From this place it may be navigated by large barges, as it has no rapids and a considerable depth; but the want of timber in the adjacent countries, and other circumstances, prevent the river being much used for navigation. Below Orskaja the Ural flows in a bottom from one to three miles wide, which is enclosed by higher grounds rising from 60 to 100 feet above it. These higher grounds are the edges of the steppes which extend south of the river. The bottom is chiefly covered with woods, composed of alder, ash, willow, and lime-trees, but in many parts there are extensive meadows. The greater part of it is annually inundated, and only a few tracts, which are not subject to be overflowed, are cultivated or converted into gardens. In its middle course the Ural is joined by the Sakmara from the north and the Ilek from the south. On the banks of the last-mentioned tributary, about 15 miles above its mouth, is a great mountain of rock-salt, which was formerly worked. In the lower part of its course, or south of Uralskaja, the river is enclosed by steppes, and flows in a bottom varying in width from half a mile to two miles and a half. This bottom is partly covered with wood and partly with swamps: it is annually inundated in its whole extent. About forty miles from its mouth the Ural divides into two channels, of which the eastern preserves the name of Ural, and the western is called Mokroi Backsai. Lower down the Ural again divides into two channels, of which the western is called Ural, and the eastern Bukharka. The last-mentioned channel is the most convenient for vessels, and on its banks are the fortress and town of Guriew. The islands forming the delta of the Ural river are covered with salt-swamps, and entirely unfit for cultivation or pasture. The population of this district derive their subsistence from the fisheries. The quantity of fish which is annually taken in the river is nearly equal to that which is caught in the Volga. The fish ascend the river to the fortress of Urask, when their course is stopped by a weir. The same kinds of fish frequent the Ural which are taken in the Volga, but it is said that some of them are of larger size. Belugas (accipenser huso) have been taken weighing 1000 lbs., and yielding 200 lbs. of caviar; and sturgeons weighing 200 lbs., and yielding 40 lbs. of caviar. Besides the caviar and isinglass, a great quantity of fish are sent to various parts of Russia. In summer the fish is salted, but in winter it is exported in a frozen state.

(Pallas, *Reisen durch verschiedene Provinzen des Russischen Reiches*; Georgi, *Beschreibung des Russischen Reiches*; Erdmann, *Beiträge zur Kenntniss des Innern von Russland.*)

URAL MOUNTAINS. The Ural Mountains extend along the eastern border of Europe, which is divided by that range from Asia. The whole of the range lies within the dominions of Russia. Its most southern extremity is on the banks of the river Ural, where that river runs from east to west, near 51° N. lat., and on both sides of 55° E. long. The most northern extremity reaches the Arctic Ocean on the Straits of Waigatz, and terminates opposite the island of Nova Zembla, which is considered by geologists as a continuation of the range. This most northern point is in 70° N. lat. and near 60° E. long. As the highest portion of the range is near the meridian of 60° E. long., or at least at no great distance from it, and as it therefore extends from south to north, it is classed among the meridional ranges of mountains.

The length of the range is about 1250 miles and more than that of the Appalachian Mountains in North America, if taken in the widest extent: but in width it is inferior to that chain. It is only towards the southern extremity, near 53° N. lat., that the ridges spread over a tract which is about 100 miles wide, but farther north it narrows to less than half that space, and nearly in the centre, between 56° and 60° N. lat., the mountain-range is hardly 20 miles across. Farther north it grows wider, but this portion of the mountains is very imperfectly known. According to a rough estimate, based on the most recent maps, the whole area of the Ural Mountains does not much exceed 120,000 square miles, or not more than the extent of the surface of the British Islands. The general elevation of the range is not great, none of the summits rising to more than 6800 feet above the sea, and the highest parts of the range often fall short of 2000 feet. The eastern slope of the chain is rather rapid, as it descends with steep declivities to the great plains of Asia, which are contiguous to its base. On the west the mountains do not immediately border on the great plains of Eastern Europe, but are separated from them by a hilly tract from 20 to 40 miles wide, whose general level decreases gradually as it approaches the plains. The whole range of the Ural Mountains may be divided into three portions, the Southern, Central, and Northern Ural; and this division is founded on the physical character of the mountains.

The *Southern Ural* extends from the banks of the Ural River to 55° 30′ N. lat. There are indeed hills of moderate elevation south of the river, but they are isolated and cannot be considered as a continuation of the range. On the northern side of the river, where it runs from east to west, the high ground approaches its banks so as to leave only a comparatively small tract of low and level ground along its course. The ascent of these high grounds is very much broken and rapid, but not long, as in general the summit of the high ground is only from 600 to 700 feet above the surface of the river. When this elevation is attained, it is found that the country extends in a kind of table-land, which gradually rises higher, and near 53° N. lat. may be from 1200 to 1800 feet above the surface of the sea. This tract is called the table-land of the Sakmara, from an affluent of the Ural river which drains nearly the whole of it. On the east the table-land declines with a steep descent to the river Ural, where it flows from north to south, but on the west its slope is very gentle, and it is connected with the low ridge called Obstshei Sirt, which traverses the steppe which is farther west, and terminates on the banks of the Volga, opposite Kamyshin (between 50° and 51° N. lat.). The surface of the table-land is very much broken, and in many parts there are rocky hills of moderate elevation, but they do not constitute ridges except on the banks of the small river Ick, an affluent of the Sakmara, where on the most recent maps a continuous ridge of hills is marked. A considerable portion of the table-land is wooded and well stocked with animals, which supply the Bashkires with a part of their subsistence. There are some large swamps.

On the north side of the table-land of Sakmara are two ranges of mountains, of which the eastern is called the Irendik Mountains, but farther north it takes the name of Ural-Tau (or Girdle Mountains). It runs north by east to 55° 30′ N. lat. In a few places it contains elevated summits, for instance, near its southern extremity, east of Lake Tolkash, where it is more than 2900 feet above the sea; but in general the summit is a level plain about 2000 feet high and seven or eight miles wide: it is mostly covered with swamps. The western chain has no general name. It rises in the most southern bend of the river Bialaya, which flows first to the east and afterwards to the west of it, and runs nearly north-east, gradually approaching the Ural Tau. Near its southern extremity, which is less than 50 miles distant from that of the Ural Tau, it does not rise much above the general level of the table-land of Sakmara; but as we proceed farther north it increases in elevation, and exhibits several high summits, among which are the Yaman-Tau, at the source of the Bialaya, and the Iremel-Tau, north of it. The last-mentioned mount is the highest in the Southern Ural, and rises more than 4700 feet above the sea-level; and snow is found in some ravines near its summits all the year round. The whole western chain is thickly wooded, but many of the slopes are nearly inaccessible, owing to the deep swamps on their sides. Wild animals are very numerous, especially bears, deer, and elks. The valleys between the ranges are either destitute of trees and covered with thick grass, or swamps. In some places however there are extensive woods, consisting of fir, birch, larch, elms, and lime-trees: there is also oak, but on account of the wetness of the soil the wood is unfit for economical uses.

The two chains just mentioned approach one another at the place where the rivers Ural, Bialaya, and Ai, an affluent of the Ufa, originate, but they do not join. They run parallel to one another from 54° 30′ to 55° 30′ N. lat., being hardly 10 miles distant from one another. The eastern, which preserves the name of Ural Tau, is a continuous range, but not so high as the western, which is composed of three ridges, called from south to north Oorengai Tau, Tagannai Tau, and Yeorma Tau. Between these ridges are depressions, through which the rivers flow westward to the Ufa and Bialaya. The Oorengai Tau is stated to rise 3000 feet above the sea-level, the Tagannai to 3500 feet, and the Yeorma to a still greater elevation. The Ural Tau does not rise in these parts above 2000 feet, and is frequently much lower. Its summits are also less precipitous than those of the western chain. The valley between the two chains is about 1000 feet above the sea-level, and occupied by a considerable number of insulated hills. In this valley are the principal mines of Slatoust.

A third range lies farther east, and runs parallel to the Ural Tau, but is not connected with it. Between 55° 30′ and 54° 30′ N. lat. it is not inferior to the Ural Tau in elevation, but in advancing farther south it decreases considerably in height, and terminates between 54° and 53° in isolated hills. It bears the name of Ilmenes Tau, and appears to be sterile and destitute of trees, but its resources have not yet been examined.

The *Central Ural* extends from 55° 30′ to 58° N. lat. Near the source of the river Ufa the ranges which we have noticed hitherto disappear entirely, and no elevated ridge or summit is to be seen. This part of the Ural Mountains may be considered as a wide swell, which begins on the west on the banks of the river Kama, an affluent of the Volga, and rises continually but gradually for 50 or 100 miles more, until it attains its highest level, whence it extends in an uneven plain, and then descends on the eastern side, likewise with a rather gentle but much shorter slope. The lower edge of the western slope at the town of Perm, on the Kama, is only 378 feet above the sea-level, the highest point on the road leading from Perm to Ekatarinburg between Bilimbayewsk and Reschötui, is 1638 feet, and Ekatarinburg, on the plain east of the eastern declivity, is 858 feet above the sea-level. The wide western slope presents hardly any other inequalities except those produced by the rivers which, descending from the crest of the mountain system, run to the Kama, and have worn out deep channels. The higher ground between the water-courses consists of undulating plains, which in most parts are covered with swamps destitute of trees, but in other places are overgrown with woods, which however do not present the vigorous growth which is observed in the forests of the Southern Ural. This part of the Ural Mountains is better known than any other, as it is traversed by the great commercial road between Russia and Siberia, and most of the mines which are worked are in this portion of the range.

Between 58° and 61° N. lat. are the mountains called the Ural of Verkhotoori, which some writers consider a part of the Central Ural, and others as attached to the Northern Ural. In these parts the higher portion of the range is covered with rocky mountains, which usually form elevated summits. The most southern of these summits is the Pawdinskoi Kamen, which, according to some authorities, rises to the height of 6829 feet above the sea; but, according to others, only to about two-thirds of that elevation. This summit is near the village of Pawdinskoï, west by north of Verkhotoori, and on the north of it are other summits, which rise to between 5000 and 6000 feet above the sea. The low depressions by which these summits are separated from one another are very swampy, but generally covered with woods, which also extend over the lower declivity of the summits, whilst the higher part is above the line of trees, and presents either bare rocks, or, where it is covered with soil, swamps of great depth. Though none of these summits appear to be covered with snow all the year round, masses of ice are found even at the end of the summer in the ravines which furrow the northern declivities.

The *Northern Ural* occupies that portion of the range which extends from 61° to 70° N. lat. It is very little known, being rarely visited by the Russians themselves, who call it the barren Ural, in opposition to the Central and Southern Ural, which are rich in mines and covered with wood, whilst the Northern Ural consists of rock destitute of trees. These rocky masses are nearly always covered with clouds, and composed of large pieces of broken rocks, which are apparently unconnected. The lower tracts between them are occupied by moors or covered with mosses. There are forests of large pines as far north as 63° N. lat., but farther north the growth of these trees is stunted, and near 65° N. lat. they disappear. This tract of the mountain-system is only visited in summer by the Vogules and Samoyedes. It does not seem to rise to a great elevation, and where it terminates on the Arctic Ocean it is composed of broken rocks covered with swamps.

The Ural Mountains abound in ores more than any other mountain-range in the eastern continent, so far as it is yet known. It is probable that a very small portion of this wealth has been discovered, as most of the mines of this mountain-system have been opened within the last seventy or eighty years; and hardly a year passes without new deposits being discovered.

(Pallas, *Reisen durch verschiedene Provinzen des Russischen Reiches*; Georgi, *Bemerkungen auf einer Reise im Russischen Reiche*; Hofmann and Helmerson, *Geognostische Untersuchungen des Süd-Ural Gebirges*; Kupffer, *Voyage dans l'Oural.*)

It has been observed that the Ural slopes much more gradually on the western than on the eastern side. The northern portion is bare and naked: the basis is granite, and the superior stratifications are limestone and quartz, and many erratic blocks are scattered over the surface. The central and southern portions abound in wood, chiefly pines, cedars, larches, and other natives of a northern climate; but the oak and ash are found in the south-western parts. There are many rich valleys and fine pastures, where great numbers of cattle are bred. Numberless rivers abounding in fish issue from both sides of the chain, the principal of which are the Sosva, the Isset, the Tobol, the Emba, the Ural, the Belaia, the Kama, and the Petchora. There are seven passes over these mountains: the five that are the most easy to cross are—the road from Perm to Ekatarinburg; that to Petropauloskaja, and the three roads to Orenburg. Besides the principal fair, which is held annually at Irbit, for the productions of the mines and manufactures of Siberia, the chief staple place in the interior is the fair at Nischnei-Novogorod; and for the communication with foreign countries the harbours of Petersburg, Archangel, and Taganrog.

Mention has been made in several preceding articles [EKATARINBURG; ORENBURG; PERM; RUSSIA, Mineral Productions of] of the quantities of iron, copper, gold, and platinum obtained from the mines of the Ural, but the continually increasing quantity of gold obtained in the Russian empire seems to require more especial notice, which we are enabled to give from authentic and official sources.

The iron and copper mines of the Ural Mountains had long been considered among the most valuable sources of the national wealth, when, in the middle of the eighteenth century, it was discovered that gold-mines also existed there; and in 1754 an essay was first made to work them. The quantity obtained was small. The first mines discovered and worked were those of Ouktoussa, on the banks of the Isset, and those of Beresof, 15 miles north-east of Ekatarinburg. For several years the result of the working of the mines was far from being so advantageous as it has since become: up to 1820, inclusive, the quantities of gold procured by washing the sand of the district of Ekatarinburg never exceeded 10 poods in one year; but since 1823, when works were opened in the districts of Bogoslowsk, Goroblagodatsk, and Zlatousk, the annual product of the mines of the Ural has rapidly increased. The largest quantity obtained in one year was in 1831, since which there was a decrease to 270 poods in 1836; subsequently it has fluctuated, but on the whole increased. From 1754 to 1822 inclusive, the total quantity of gold obtained appears to have been about 300 poods; but from 1822 to 1840 both years inclusive, the total amount was 4996 poods and 11 pounds: viz. 2043 poods 33 lbs. from the works of the crown, and 2952 poods 18 lbs. from those belonging to private persons, the principal of whom are the famous Demidoff, Jakowleff, Strogonoff, and the mercantile house of Gubin.

But besides the gold of the Ural mountains, a very large and constantly increasing quantity has been obtained since 1829 from Eastern Siberia. In the 16 years from the beginning of 1823 to the end of 1838 there were produced—

I. Gold with a mixture of silver (about 88 per cent. of pure gold) from the mines and washings.

	Poods	lbs.	Poods	lbs.
A. From the Crown works:—				
a. In the Ural Mountains .	1592	14		
b. In the district of the Altai	111	19		
c. In the district of Nertschinsk	3	5		
Total from the Crown works			1706	38
B. From the private works:—				
a. In the Ural Mountains .	2543	24		
b. From the interior of Siberia	466	6		
			3009	30
General total . . .			4716	28
II. Raw platinum from the Ural chain:—				
a. From different Crown works .			29	0
b. From the private works . .			1230	4
Total			1259	4

The gold-mines (or rather auriferous sands, from which the gold is procured by washing), discovered since 1829 extend along the whole northern declivity of the mountains that bound Siberia on the south, from the Obi to beyond Nertschinsk, especially on the eastern side of the Kusnetsk range, which extends on the east side of the Altai from Sandypshoi northward, past Kusnetsk to the Kija, in the tract between the Upper Tom and the Upper Tschulym, on the Yenissei near Minusinsk and Abakansk, thence eastwards to the Kan and the Birussa, and along the whole upper course of these tributaries of the Yenissei; farther on the south-west side of Lake Baikal and of the Angara, which issues from it, as also on the east side of the Jablonoi Chrebet, in the valley of the Schilka, above and below Nertschinsk. Now as gold is found as well to the west of the Ural Mountains towards Perm as about Udskoi, near the sea of Ochotzk, we see that an auriferous zone, though interrupted here and there, included between the 50th and 60th degrees north latitude, traverses the whole of the antient continent in a line which is one-half longer than the greatest breadth of Africa. The quantity of gold obtained in the interior of Siberia is progressively increasing, for in 1840 it amounted to 252 poods, which is 62 poods more than in 1839. In 1841 there was a further increase, as follows:—

	Poods	lbs.	Poods	lbs.
I. In the Ural Mountains:				
a. From the Crown works .	134	33		
b. From private works .	168	33		
Total . . .			303	26
II. In the rest of Siberia:				
a. From the crown works .	37	0		
b. From private works .	318	0		
			355	0
In the whole empire . .			658	26

	Poods	lbs.	Poods	lbs.
To these must be added—				
Gold from the silver in the mines .			31	20
Total			690	6
Platinum :—				
In the Crown works . .	3	13		
In the private works . .	105	7		
Total . . .	108	20		

Hence it appears that while the quantity of gold produced in the Ural Mountains remains nearly the same, that obtained in the interior of Siberia is rapidly increasing, having been, in 1839, 190 poods; in 1840, 252 poods; and in 1841, 355 poods. It is therefore not improbable that within a few years the gold obtained in the whole empire will amount to 1000 poods in a year.

The copper, iron, and salt produced in the Ural Mountains are of great importance and value. [Perm.] A variety of other mineral productions are also found there, among which there are topaz, iridium, malachite, the onyx, topaz-emerald, beryl, and agate. Diamonds have been found within these few years (first in 1829), but few in number and of small size: they were of very pure water.

A peculiarity in the Russian mineral productions is worthy of notice, viz. the extraordinary size of some specimens. Thus, in 1825, there were found 25 lumps of pure gold, weighing together 2 poods 26 lbs.; one of them was 14 lbs. weight. Afterwards a lump weighing 24 lbs. was found; and on the 7th of November, 1842, a lump weighing 87 Russian pounds was discovered. Pieces of platinum have been found which weighed 10, 19, and 20 lbs.

In the collection of the Institution of the Mines at St. Petersburg, is the celebrated specimen of malachite from the Ural, which is 3 feet 6 inches high, and nearly as broad: it is of a beautiful emerald-green colour, and is valued at 525,000 rubles. A very pure beryl, of a bright green colour, weighing six pounds, was found at Ekatarinburg.

(*Russian Official Journals*; Stein, *Handbuch der Geographie und Statistik*, edited by Hörschelmann; Cannabich, *Lehrbuch der Geographie*; Hassel, *Handbuch der Erdbeschreibung*; *das Russische Reich in Europe*; Schubert, *Handbuch der Allgemeinen Staatskunde*, vol. i.; *das Russische Reich*; Brockhaus, *Conversations Lexicon*; Adolph Erman, *Reise durch Nord-Asien*; Rose, *Reise nach dem Ural, dem Altai, und dem Kaspischen Meere*, von Alexander von Humboldt, G. Ehrenberg, und Gustav. Rose, vol. i., 1837; vol. ii., 1842. These volumes contain the mineralogy and geology, by Mr. Rose.)

URAMIL. When a hot saturated solution of thionurate of ammonia is treated with hydrochloric acid in excess, the mixture is converted into a semifluid mass. The uramil thus obtained is in the form of plumose acicular crystals, which are permanent in the air, and become of a pink colour when heated; they are insoluble in cold and but slightly soluble in boiling water. The alkalis ammonia, potash, and soda dissolve uramil, and acids precipitate it from them unchanged. The solutions in ammonia and potash become of a purple colour by exposure to the air, and deposit green acicular crystals of a brilliant metallic lustre. If potash solution be boiled, ammonia is evolved and uramilic acid is formed, and dilute acids produce similar decomposition. It is soluble in concentrated sulphuric acid, and is precipitated from it by water; by concentrated nitric acid it is resolved into alloxan, with the evolution of hyponitrous acid, and the formation of nitrate of ammonia.

Uramil is composed of—

Five equivalents of hydrogen . .	5
Eight equivalents of carbon . .	48
Six equivalents of oxygen . .	48
Three equivalents of azote . .	42
Equivalent . .	143

URAMILIC ACID. This is obtained by decomposing uramil: when a saturated solution of thionurate of ammonia in cold water is added to a small quantity of sulphuric acid, and the mixture is evaporated by a gentle heat, uramilic acid is slowly deposited.

The properties of this acid are, that it has the form of four-sided prisms, which are transparent and of a glassy lustre, or in the state of fine silky needles; it is soluble in about six to eight parts of cold and in three parts of boiling water; its acid properties are feeble. This acid loses no weight when heated to 212°, but becomes of a slight pink colour.

It forms soluble crystalline salts with ammonia, potash, and soda. It consists of—

Ten equivalents of hydrogen .	10
Sixteen equivalents of carbon .	96
Fifteen equivalents of oxygen .	120
Five equivalents of azote . .	70
Equivalent . .	296

URA'NIA, a genus of plants belonging to the natural order Musaceæ. This name, which is that of one of the Muses, was given rather fancifully by Schræber to this genus, on account of its natural order. The name which the plant bears in Madagascar is Ravenala. This genus has but one species, the *Urania speciosa*, which is a native of Madagascar. It has a superior, coloured perianth, consisting of three petals; a two-leaved nectary, and one of the leaves bifid; a 3-celled many-seeded capsule, and the seeds in two rows covered with an aril. The flowers are arranged upon a spadix, which are nodding, very similar to the bananas, which belong to the same family. The leaves are arranged in a fan-shape. The seeds of this plant are said to constitute a wholesome food. In its cultivation in this country it requires a strong heat and an abundant supply of moisture. It must be propagated by seeds, which will grow freely in a loamy soil, if planted when they are recently imported. It may be numbered amongst the most splendid of our hothouse plants.

URANIC ACID. [Uranium.]

URANIENBURG, built in 1576 as an observatory for the astronomer Tycho Brahé, is now in ruins. It is situated in 55° 55′ N. lat. and 12° 41′ E. long., in the small and fruitful island of Hveen or Ween, in the Sound, opposite Landscrona. It formerly belonged to Denmark, but was ceded in 1658 (57 years after Tycho's death) to the Swedes, who destroyed Uranienburg. [Brahe', Tycho.]

URANITE. [Uranium.]

URA'NIUM, a metal discovered by Klaproth, in 1789, who named it after the planet Uranus, the discovery of which had previously occurred in the same year: the mineral from which it was first obtained is called *pechblende*, and this we shall presently describe. We shall not state the properties which are attributed to this metal by its discoverer, because some very late researches by M. Péligot have rendered it more than probable that what Klaproth considered as metallic uranium was in fact an oxide of that metal.

M. Péligot obtained this metal by decomposing its chloride by means of potassium, a process which had been successfully adopted for procuring aluminum and magnesium: the metal so separated is partly in the state of a black powder, and partly agglomerated; by carefully detaching the portions which adhered to the sides of the crucible, plates of a metallic lustre, comparable to that of silver, were obtained; these were susceptible of being filed, but possessed a certain degree of malleability, and had evidently undergone incipient fusion. Uranium is very combustible; at a moderate degree of heat, in contact with the air, it burns with a remarkably white and shining light; the combustion occurs at so low a temperature, that it may take place on paper without causing it to burn. If small particles be shaken from the filter on which the metal in powder has been collected, portions so minute as to be scarcely visible burn with brilliant sparks on coming near the flame of a candle. When heated in a capsule, uranium burns brilliantly, and is converted into a deep green-coloured oxide, the bulk of which is considerably greater than that of the metal employed.

Uranium does not appear to suffer any alteration by exposure to the air, nor does it decompose water at common temperatures, but when put into diluted acids it dissolves in them with the evolution of hydrogen gas.

We shall now describe such minerals as contain uranium:—

Pechblende, Pitchblende, Oxide of Uranium.—This, as already noticed, is the mineral from which the metal was first obtained by Klaproth. It occurs in amorphous and reniform masses, and also pulverulent. Structure granular, compact. Fracture uneven, conchoidal. Hardness: scratches phosphate of lime, is scratched by felspar. Colour greyish, brownish, and iron-black. Opaque. Lustre imperfect metallic. Specific gravity 6·468. Before the blowpipe infusible *per se*, but colours the exterior flame green; with borax it fuses into a dull-yellow glass, which becomes green in the reducing flame. In powder, it dissolves slowly in nitric acid.

Pitchblende occurs in Saxony, Bohemia, &c., and in Cornwall.

Analyses by Klaproth (1) and Pfaff (2)—

	(1)	(2)
Oxide of uranium .	86·5	84·52
Oxide of iron . .	2·5	8·24
Silica . . .	5·0	2·02
Sulphuret of lead .	6·0	4·20
Oxide of cobalt .	0·0	1·42
	100·	100·4

This mineral is evidently a mere mixture of oxide of uranium with other substances, and, besides those above enumerated, Arfwedson found the oxides of arsenic, zinc, and copper in the pitchblende of Joachimsthal.

Uranite, Uran Mica, Calcareo-phosphate of Uranium.—Occurs crystallized. Primary form a square prism. Cleavage parallel to the terminal planes, very distinct. Fracture foliated. Hardness: scratches sulphate of lime, and is scratched by the carbonate. Colour lemon or golden yellow, and yellowish-brown. Lustre adamantine. Transparent, translucent. Specific gravity 3·12 to 3·33.

It is found in veins in granite at St. Symphorien near Autun, and at St. Yrieux near Limoges in France, and also in several places in Saxony.

Analysis of a specimen from Autun by Berzelius—

Phosphoric acid . .	14·63
Oxide of uranium . .	59·37
Lime	5·66
Silica and oxide of iron .	2·85
Magnesia and oxide of manganese	0·19
Barytes . . .	1·51
Water	14·90
Fluoric acid and ammonia—traces	
	99·11

This mineral appears essentially to consist of the phosphates of uranium and lime.

Chalcolite, Green Uranite, Cupreo-phosphate of Uranium.—This mineral agrees with the preceding in crystalline form, but differs in colour, it being grass or emerald green, owing to the presence of phosphate of copper instead of phosphate of lime.

It occurs in Cornwall, was first shown to contain uranium by the Rev. Mr. Gregor, and analysed afterwards by R. Phillips (1) and subsequently by Berzelius (2): the results of the experiments gave as its composition:—

	(1)	(2)
Phosphoric acid .	16·0	15·56
Oxide of uranium .	60·0	60·25
Oxide of copper .	9·0	8·44
Water . .	14·5	15·05
Stony matter . .	0·5	0·70
	100·	100·

Carbonate of Uranium, Uran Bloom, Uraconise.—Occurs in small indistinctly crystalline flakes. Lustre but slight. Colour bright yellow.

Occurs in silver-veins at Joachimsthal in Bohemia, forming a coating on pitchblende.

Sulphate of Uranium.—This occurs as a thin botryoidal yellow-coloured coating over the surface of the minerals on which it is found. It is friable and soils the fingers. Partially soluble in water, and the remainder in nitric acid: both solutions contain sulphate of uranium, and are of a yellow colour.

Occurs at Joachimsthal in Bohemia.

Sulphate of Uranium and Copper, Johannite.—Occurs crystallized. Primary form an oblique rhombic prism. Crystals very minute. Fracture imperfect conchoidal. Hardness 2 to 2·5. Taste slightly bitter. Partially soluble in water. Colour deep grass-green. Streak paler. Lustre vitreous. Translucent. Specific gravity 3·19. It occurs at Joachimsthal in Bohemia, and has not been quantitively analyzed.

Having now described the properties of uranium and the minerals which yield it, we proceed to consider the compounds which it forms with other bodies.

Oxygen and Uranium.—According to M. Péligot, there exist, or may be formed, three oxides of uranium: the protoxide, formerly considered as metallic uranium; that prepared by calcining the nitrate, known by the name of deutoxide of uranium, or uranous acid; lastly, the peroxide, uranic acid, which enters into the composition of the yellow salts. Besides these oxides, it is stated, by the chemist above named, that there are two suboxides of uranium produced by the decomposition of the subchloride by ammonia, and an oxide intermediate as to protoxide and peroxide of uranium, which is formed when the oxide obtained by calcining the nitrate is submitted to the action of oxygen.

Suboxide of Uranium.—When ammonia is added to a solution of subchloride of uranium, a brown precipitate is formed, which undergoes various changes of colour and composition by absorbing oxygen. In the first instance it is probably composed of—

Three equivalents of oxygen	24
Four equivalents of uranium	240
Equivalent . .	264

Its extreme instability however renders its analysis very difficult. It decomposes water, to combine with its oxygen to form the apple-green suboxide, the analysis of which is equally difficult.

Protoxide of Uranium, formerly regarded as metallic uranium. This may be prepared by several processes; one of the best consists in decomposing the yellow oxalate of uranium by hydrogen: the process requires several precautions. Prepared in this manner the protoxide is extremely pyrophoric, the access of air causing it to burn with feeble incandescence and converting it into black peroxide: it is of a cinnamon-brown colour. When the protoxide of uranium is obtained by reducing the double chloride of potassium and uranium, not by means of hydrogen, it is obtained in crystalline scales possessing a high degree of lustre, and being then in a higher state of aggregation, it is not pyrophoric; and when procured by decomposing the nitrate, the protoxide is of a maroon colour. When thus prepared in the dry way, it is not acted upon either by hydrochloric or sulphuric acid when diluted; but dissolves in the latter, when concentrated: nitric acid also dissolves it, but nitrate of peroxide of uranium is obtained.

This oxide may likewise be obtained in the moist way, and then it is soluble in dilute acids: it is precipitated in the state of hydrate, by adding ammonia to the green solution of chloride of uranium; the precipitate is of a reddish-brown colour, which by ebullition becomes black and dense, probably because it is dehydrated. It may also be procured by putting fragments of marble into the green solution of chloride of uranium.

It is composed of—

One equivalent of oxygen .	8
One equivalent of uranium .	60
Equivalent . .	68

Deutoxide or Black Oxide of Uranium is obtained by calcining the nitrate at a high temperature. It is not decomposable by heat; when added to acids they do not directly combine with it, but a mixture of salts of the protoxide and peroxide is formed. This oxide has been usually called the protoxide: it is composed of—

Five equivalents of oxygen .	40
Four equivalents of uranium	240
Equivalent . .	280

Tritoxide of Uranium, or Olive Oxide.—When any of the preceding oxides are submitted at a low red heat to the action of oxygen, the olive-coloured oxide is formed. It has a velvety appearance, and when strongly heated it loses oxygen and is converted into the black oxide, and when acted upon by acids there is formed a mixture of yellow and green salts, in which the salts of the peroxide exist in the larger proportion, and this is an advantageous process for preparing them.

It consists of—

Four equivalents of oxygen .	32
Three equivalents of uranium	180
Equivalent . .	212

Peroxide of Uranium, or Oxide of the Yellow Salts.—This oxide, which is of all the most important, and obtained with the greatest facility, has not hitherto been obtained in a separate state: when nitrate of uranium is decomposed with a gentle heat, an orange-coloured subsalt remains, which by the application of a stronger heat becomes olive and then black oxide; when an alkali is poured into a saline solution of this oxide, the yellow precipitate formed retains alkali in combination; even uranate of ammonia resists the prolonged action of boiling water and also of a vacuum; by heat the ammonia and water are not expelled till peroxide itself undergoes decomposition.

This oxide consists of—

Three equivalents of oxygen	24
Two equivalents of uranium	120
Equivalent . .	144

Chlorine and Uranium.—The protochloride is obtained by passing a current of dry chlorine gas over an intimate mixture of equal parts of any oxide of uranium and charcoal submitted in a glass tube to a high temperature. The chloride of uranium formed appears in the state of a red vapour, and condenses in the cool part of the tube in very regular octohedrons of a metallic lustre, and of a black or green colour according to their size.

Chloride of uranium is volatile, and attracts water so strongly that it very soon becomes fluid by exposure to the air, the moisture of which also decomposes it. It consists of—

One equivalent of chlorine .	36
One equivalent of uranium .	60
Equivalent . .	96

Subchloride of Uranium.—This compound is obtained by passing a current of dry hydrogen gas over the chloride of uranium moderately heated in a glass tube. The residue of this operation is of a deep brown colour, in fine filaments which are but slightly volatile at the temperature at which it is formed: it is very soluble in water; the solution is purple at first, but in a few seconds it becomes green; it gives out hydrogen gas, and at the same time deposits a red powder, which is very probably oxide of uranium, yielded in consequence of the transformation of this substance into chloride of uranium. It is composed of—

Three equivalents of chlorine	108
Four equivalents of uranium	240
Equivalent . .	348

Sulphuret of Uranium of a black colour may be obtained by adding the alkaline sulphurets to solutions of uranium, or by passing the vapour of sulphuret of carbon over the oxide at a high temperature.

We shall now briefly notice some of the oxysalts of uranium.

Sulphate of Protoxide of Uranium.—This salt is obtained by adding sulphuric acid to the protochloride of uranium, and heating the mixture, by which hydrochloric acid is expelled, and sulphate of uranium remains; by dissolving the residue in water, and evaporating the solution, green prismatic crystals of the sulphate are formed.

It frequently happens that the crystals possess a silky lustre, are greenish, and but slightly soluble in water; in this case they contain excess of base. This salt yielded by analysis—

Sulphuric acid . .	28·0
Protoxide of uranium .	46·1
Water . . .	25·9
	100·0

Oxalate of Protoxide of Uranium.—This salt is of a greenish-white colour, and very slightly soluble in water either cold or hot. It may be prepared by mixing solutions of oxalic acid and chloride of uranium; the precipitate formed is to be repeatedly washed with boiling water, in order to dissolve the yellow oxalate of the peroxide, which is more soluble, and which is first precipitated. The protoxalate of uranium, after being dried, may be exposed to the air without undergoing any perceptible change. It is composed of—

Oxalic acid . .	28·5
Protoxide of uranium .	51·2
Water . . .	20·3
	100·

Nitrate of Peroxide of Uranium.—This salt is easily obtained in fine regular crystals. It is composed of—

Nitric acid . .	21·5
Peroxide of uranium .	57·1
Water . . .	21·4
	100·

This salt is of a yellowish colour, effloresces in vacuo, and loses half its water of crystallization.

Uranium forms a considerable number of double salts, which we have not thought it requisite to describe.

Protoxide of uranium is employed in colouring glass, to which it imparts a fine lemon yellow.

According to the experiments of Dr. Elsner, ultramarine must contain sulphuret of iron as well as sulphuret of sodium, and he has given the mean of several analyses of artificial ultramarine, of natural lapis lazuli, and of an artificial product by Varentrapp:—

	Lapis Lazuli.	Artificial, from Meissen.	Elsner.
Potash . .	..	1·75	..
Soda . .	9·09	21·47	40·
Alumina .	31·67	23·30	29·5
Silica . .	45·50	45·00	40·0
Sulphur . .	0·95	1·68	4·0
Lime . .	3·52	0·02	..
Iron . .	0·86	1·06	1·0
Chlorine .	0·42	..	..
Sulphuric acid	5·89	3·83	3·4
Water . .	0·12	..	..

U'RANUS, the name which is now universally given to the planet discovered by William Herschel, while engaged in the telescopic comparison of a large number of stars, as stated in his life. On the evening of Tuesday, March 13, 1781, between ten and eleven o'clock in the evening, while engaged in examining some small stars in Gemini, he saw one which appeared to have a more sensible amount of diameter than the others. A higher magnifying power rendered this circumstance still more perceptible: and micrometrical comparisons with neighbouring stars soon showed that the object of attention was in motion. It was accordingly announced to the Royal Society as a comet, and speedily became an object of attention to the continental observers. As soon as a sufficient number of observations were obtained, attempts were made to calculate an approximate orbit upon the supposition that the body was a comet, and revolved in a nearly parabolic curve. No success attended this first effort, and it was gradually seen, first, that if a comet at all, it was one which never approached so near the Sun as Saturn; next, that a nearly circular orbit would better represent the observations than a planetary one; and finally, that the supposed comet was a planet, resembling the antient planets in every point in which it was possible to compare them.

The name given by Herschel to his new planet was Georgium Sidus, in honour of the reigning king, George III. But this name gave no satisfaction to astronomers: Laplace and others contended that the name of the discoverer should be borne by the planet; and many were found to adopt this suggestion. But the general feeling was that neither the king of England nor his astronomer was altogether in his right place, as coming after Mars, Jupiter, and Saturn; and after Neptune, Astrea, and Cybele had been severally suggested without success, Uranus (at the proposal of Bode) was adopted. The last name was appropriate, in as much as Uranus is the father of Saturn in mythology, as Saturn is of Jupiter, and Jupiter of Mars: but what will be done if a new planet should be discovered still more distant than Uranus?

The planet Uranus looks like a star of the sixth magnitude, and requires a considerable magnifying power and favourable circumstances to be observed. As soon as it was known to be a planet, a reference to old catalogues showed that it had been seen and noted as a star five times by Flamsteed, once by Bradley, once by Mayer, and twelve times by Lemonnier, the last of whom (says M. Arago) must have been the discoverer of the planet, if he had only arranged his observations so as to look at all those of the same star at once.

The early observations of Herschel gave the planet a perceptible ellipticity of form; and he thought at first that it was surrounded by a ring, but subsequently found out that this appearance was due to the telescope. But on the 11th of January, 1787, he saw several little stars about the planet; and the next day found two of them gone. By the 9th of the next month he had fully established the existence of the second and fourth satellites, had obtained their approximate times of revolution, and had ascertained that their orbits made a considerable angle with the ecliptic. It was not till the end of 1797 that he announced the existence of four more satellites, one of them nearer to the planet than either of the first two, and one between those two. Of these four new satellites, there is nothing to be said except that Herschel only saw them with great difficulty, and on the occasions when circumstances were very favourable; and that no one else has ever been able to see one of them, except Mr. Lamont, of the observatory of Munich, who saw the sixth satellite in October, 1837. But both Sir John Herschel and Mr. Lamont have carefully observed the second and third satellites; and the times of revolution which they assign to these satellites agree very well with those given by W. Herschel himself. Many have doubted the existence of the four other satellites, but those who know the writings of Herschel, and remember that if there be anything more remarkable in the history of observation than the power of the instruments which he put together, it is the skill with which he used them, will pause before they doubt of results which he announced with great deliberation,* and which, after all, only add one more to the cases in which a planet very distant from the sun has a considerable number of satellites.

The following are the periodic times of the best known satellites, the second and fourth, according to W. Herschel, Sir J. Herschel, and Mr. Lamont:—

	W. Herschel.				J. Herschel.				Lamont.			
	d.	h.	m.	s.	d.	h.	m.	s.	d.	h.	m.	s.
Second	8	16	56	5	8	16	56	31,3	8	16	56	28,5
Fourth	13	11	8	59	13	11	7	12,6	13	11	7	6,3

and the mean distances from the planet, in semidiameters of his equator, are stated by W. Herschel to be 17·022 and 22·752.

The remaining satellites, the existence of which depends on the sole authority of their discoverer, have their periods and distances, the latter also in equatorial semidiameters of the planet, given by him as follows:—

	Period.			Distance.
	d.	h.	m.	
First . .	5	21	25	13·120
Third . .	10	23	4	19·845
Fifth . .	38	1	48	45·507
Sixth . .	107	16	40	91·008

The orbits of all these six satellites differ in two material particulars from those of every other body in the solar system. They are nearly at right angles to the plane of the ecliptic (78° 58′), and their motions are retrograde, or from east to west. As far as has yet been ascertained, their orbits are nearly circular, and the motions of their nodes and variations of their inclinations, if any, very small.

The only circumstance which is known of the physical constitution of Uranus is one noticed by W. Herschel, namely, that the satellites and small stars in the neighbourhood of it disappear when they come very close to the planet, but in a manner which cannot depend on the atmosphere of the planet, since the phenomenon happens whether the satellite is before or behind it. No probable cause has been assigned for these disappearances.

The apparent diameter of Uranus is about 4″, and changes very little; the real diameter, that of the earth being 1, is about 4·3, which gives a bulk of 80 times that of the earth. The mean density is about 11-10ths of that of the sun, or one-fourth of that of the earth; and the mass of the planet is about 1-17918th of that of the sun. It is not known to revolve about its axis. Its light and heat are to those of the earth as 3 to 1000.

Elements of the Orbit of Uranus.

Epoch 1801; January 1, 0^h mean astronomical time at Greenwich.

Semiaxis major, 19·18239, that of the earth being assumed as the unit.

Excentricity, ·04667938; its secular variation not yet known. Inclination of the orbit to the ecliptic, 46′ 28″·4, its secular increase (or increase in 100 years), 3″.

Longitudes from the mean equinox of the epoch (1) of the ascending node, 72° 59′ 35″·3; its secular increase (combined with the precession), 1416″; (2) of the perihelion, 167° 31′ 16″·1; its secular increase (combined with the precession), 5250″; (3) of the planet (mean) 177° 48′ 23″·0.

Mean sidereal motion in 365¼ days, 15425″·64; sidereal revolution, 30686·8208296 mean solar days.

URAO, a variety of sesqui-carbonate of soda [Sodium] which occurs in Colombia.

URA'RIA, a genus of plants of the natural family of Leguminosæ, so named by Desvaux, probably from [illegible] 'a tail,' from the long, tufted, cylindrical racemes, which when the flower has dropped are not unlike the tails of some animals. The calyx is deeply 5-cleft, with setaceous segments. Legume, with a few ovate single-seeded joints, bent back into plaits, and nestling within the calyx. The species are chiefly natives of India: U. picta is found both in that country and on the coast of Guinea, and U. lagopoides both in India and China. They form herbs, rarely shrubs, with simple, trifoliate, or impair pinnate leaves, with the leaves and leaflets supported by stipules and stipels. Several are highly ornamental, but require heat for their cultivation.

URBAN I. succeeded, A.D. 222, Calixtus I. as bishop of the Christian congregation at Rome, under the reign of the emperor Alexander Severus. It was about this time that Minucius Felix wrote at Rome his dialogue entitled 'Octavius,' in defence of Christianity. [MINUCIUS FELIX.] We have no biographical particulars concerning Urban except that he died, some say a martyr's death, in the year 230, and was succeeded by Pontianus.

URBAN II., Otho, bishop of Ostia, and a native of France, succeeded Victor III. in the Papal chair, A.D. 1088, being elected in a council held at Terracina. Guibert antipope, under the name of Clement III., who had been set up by Henry IV. of Germany, in opposition to Gregory VII., was still acknowledged as pope by a part of the Christian world, and he had possession of some strongholds in the city of Rome. But in the following year the people of Rome, encouraged by Pope Urban, rose against the antipope and obliged him to evacuate the city. Meantime a marriage was negotiated, through Pope Urban, between the Countess Matilda, who was the great supporter of the pope against Henry, and Welf, son of the duke of Bavaria and grandson of the Marquis Alberto Azzo II. of Este. Henry of Germany, alarmed at this alliance, which strengthened the power of the pope, went to Italy with an army, and scoured the territory of Mantua, which belonged to Matilda, who was obliged to take refuge with her husband in the Apennines of the Modenese. Mantua surrendered to Henry. The people of Rome, excited by Henry's success, turned against Pope Urban, and recalled the antipope Guibert, A.D. 1091. In the following year Henry continued to devastate the territories of Matilda, and the Papal party was evidently on the decline, when the countess contrived to induce Conrad, eldest son of Henry, who was with the army in Lombardy, to revolt against his father by holding before him the prospect of becoming king of Italy. It appears that Conrad was dissatisfied with his father's brutal conduct towards himself as well as towards his step-mother Adelaide. However this may be, Pope Urban received Conrad with great kindness, and caused him to be crowned king at Milan, A.D 1093. The pope, who had been at Anagni and other places, also regained possession of Rome, except the castle of S. Angelo and the Lateran palace, in which the antipope kept garrisons; the antipope himself was staying with Henry at Verona. In the following year the keeper of the Lateran palace gave it up to Urban for a sum of money, and some time after the pope repaired to Tuscany, where he was met by the Countess Matilda. About this time Henry's wife Adelaide, who was kept in confinement by her husband at Verona, contrived to escape, and sought the protection of the Countess Matilda, and there he disclosed all the particulars of her husband's brutality owards her. In 1095 Pope Urban assembled a council at Piacenza, at which two hundred bishops were present, as well as Queen Adelaide, who made a solemn exposure of her husband's conduct towards her. The antipope and his adherents were excommunicated. There were also present envoys from the emperor Alexius Comnenus, requesting assistance against the Turks. It was in this Council that Pope Urban first proclaimed the Crusade, but the furtherance of that object was put off till the next Council, which he pope convoked at Clermont in France, in the autumn of the same year, and where multitudes took the Cross amidst the general exclamation of 'Dieu le veut,' 'God wills it.' In the following year, 1096, Pope Urban assembled two more Councils at Nismes and at Tours for he same object, and various bodies of the Crusaders, he principal of which was commanded by Godefroi de Bouillon, set out on their march through Germany and Hungary towards Constantinople. Another corps under he orders of Hugh, brother of Philip I. king of France, ook the road by Italy, and were met by Pope Urban in Tuscany, who gave them his solemn blessing. They then proceeded to Rome, from whence, with the exception of he castle of S. Angelo, they drove away the antipope and is partizans. They then proceeded to Apulia, from thence they crossed over to Greece. Pope Urban returned o Rome, where he celebrated the Christmas festivals with reat splendour.

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* Sir John Herschel ('Astronomy,' *Cab. Cycl.*) speaks with little confidence on this point, being perhaps unwilling to be positive in a matter in which a suspicion of filial bias might exist against his judgment. 'It is attended by satellites, two at least, perhaps five or six' (p. 290). 'Two undoubtedly exist, and four more have been suspected' (p. 299).

In the following year, 1097, Henry IV. left Italy, where is party was reduced very low, and returned to Germany. Thus Pope Urban and the Countess Matilda at last obtained their object. His rebel son Conrad, who had married a aughter of Roger, count of Sicily, was acknowledged king f Italy, although his power was little more than nominal, s the great feudatories, such as Countess Matilda, the Marquises of Este, Monferrato, Susa, &c., acted as sovereign princes, and the great towns of Lombardy and Tuscany ad already established their independence.

In the year 1098 Pope Urban repaired to Campania, where the Norman princes, Roger, duke of Apulia, his uncle Roger, count of Sicily, and Richard, count of Aversa, were besieging Capua, which had revolted against Richard. The pope endeavoured to induce the citizens to capitulate, ut not succeeding, he repaired to Beneventum. Capua aving at last surrendered, Duke Roger, and his uncle the ount of Sicily, went to Salernum, whither Pope Urban went also to have an interview with Count Roger, who was bout returning to Sicily. It was on this occasion that the ope appointed by a bull the count and his successors perpetual apostolic legates in Sicily. This was the origin of the immunities of the church of Sicily, which were afterwards a subject of dispute between the kings of Sicily nd the see of Rome, and for the maintenance of which a court, called the Tribunal 'de Monarchia,' was established.

From Salernum Pope Urban repaired to Bari, where he eld a Council, which was attended by one hundred and ighty-five bishops, including several Greek prelates. The ontroversy about the word 'filioque,' in speaking of the roceeding of the Holy Ghost, which the Greeks rejected, as agitated, and Anselm, archbishop of Canterbury, supported with much eloquence and erudition the part of e Western Church. The Greeks however would not ive up the point. From Bari Pope Urban returned to ome, where he celebrated the Christmas festivities. He lso succeeded at last in obtaining possession of the Castle t. Angelo. About Easter in the following year, 1099, he eld another Council at Rome, in which the antipope uibert and his adherents were again excommunicated, nd the censure of the church was pronounced against ose priests who lived in a state of concubinage. In the llowing July Pope Urban died, just about the time that e Crusaders took possession of Jerusalem, and was succeeded by Paschal II. Urban II. was a man of considerable abilities and activity; his personal character appears o have been generally esteemed. By his perseverance nd timely policy, and through his connection with the ountess Matilda in the north, and the Norman princes in he south, of Italy, he confirmed and strengthened the apal supremacy which Gregory VII. had laboured to stablish.

(Muratori, ***Annali d'Italia***, and the authorities therein uoted.)

URBAN III., Uberto Crivelli, archbishop of Milan, succeeded Lucius II., in November, 1185. He strove hard to send assistance to the Christians in Palestine, who were hard pressed by Salah-ed-deen, and he repaired to Venice for the purpose. But he fell ill and died at Ferrara, in October, 1187, after a pontificate of less than two years.

URBAN IV., James, Patriarch of Jerusalem, a native of Troyes, in France, succeeded Alexander IV. in 1261. Manfred was then on the throne of Sicily and Apulia, and was the acknowledged head of the Guibelines of all Italy, whilst the popes were at the head of the Guelph party, hostile to Manfred and the whole house of Suabia. [MANFREDI.] Urban persevered in the policy of his predecessors, and went even farther in his determined hostility against Manfred. He summoned him to appear before him to answer numerous heinous charges which he stated against him, and as Manfred refused to appear, unless accompanied by a sufficient escort for his own protection, the pope excommunicated him as a tyrant, a heretic, and an enemy of the Holy Church. Manfred sent troops to attack the Papal state, and the pope proclaimed a crusade against Manfred, and induced Robert, count of Flanders, to come to Italy with a number of French knights and men-at-arms, who, after defeating the Guibelines of North Italy, and restoring the ascendency of the Guelph party, marched against Manfred himself, who was encamped on the frontiers of his own kingdom. But one of those insurrections, so frequent among the people of Rome in the middle ages, obliged Urban to recall the count of Flanders in order to support him against the insurgents. This gave some respite to Manfred, but Pope Urban, who was determined in his purpose, sent a legate to Charles, count of Provence and Anjou, brother of Louis IX. of France, offering him the crown of Sicily and Apulia as a fief of the Roman see. Charles accepted the offer, and his brother, Louis IX., gave also his consent, though with reluctance, as that good king had great doubts concerning the justice of the measure. From this fatal convention originated all the wars of the Anjous for centuries after, for the possession of Naples and Sicily, and the subsequent invasions of Italy by the French kings, who derived from the house of Anjou their pretensions to the crown of the Two Sicilies. Charles was making his preparations for attacking Manfred, when Pope Urban fell ill and died, at Perugia, in 1264, and was succeeded by Clement IV.

URBAN V., Guillaume de Grimoard, a Frenchman, and abbot of St. Victor of Marseille, succeeded Innocent VI., A.D. 1362. Like his predecessor, he took up his residence at Avignon, leaving to the legate Albornoz to defend the temporal interests of the Roman see in Italy. [ALBORNOZ, GIL DE.] Bernabò Visconti, lord of Milan, a brutal but determined man, who oppressed his own subjects and encroached upon all his neighbours, paying no more regard to churchmen than laymen, was excommunicated by the pope for having usurped several territories of the Roman see. In 1364 however a reconciliation took place, and Bernabò was relieved from the censures of the church; but the reconciliation did not last long, as Bernabò was too restless to remain at peace. In 1367 Pope Urban took the resolution of restoring the pontifical court to Rome, to which he was urged by the Romans themselves. Petrarch also wrote him several hortatory letters to the same purpose. Urban landed on the coast near Corneto, and from thence repaired to Viterbo, where Cardinal Albornoz had prepared everything for his reception. After some time the pope proceeded to Rome, in the month of October, escorted by Niccolo of Este, marquis of Ferrara, Amadeus, count of Savoy, Malatesta, lord of Rimini, and other great feudatories, and by the ambassadors of the emperor, of the king of Hungary, and of Queen Joanna of Naples, and a numerous retinue of men-at-arms. He was met outside of the gates by the Roman clergy and people, who accompanied him in the midst of acclamations to the Basilica of the Vatican. The pope found the city of Rome in a very dilapidated condition, many churches, palaces, and houses in ruins, a population scanty and poor, and other marks of the long absence of a central government and court. Nearly the whole of Italy was at that epoch in a deplorable condition. The various princes and republics were continually at war with each other, and kept for the purpose, at a great expense, mercenary bands of Germans, Hungarians, English, Bretons, and other foreigners, led by their respective condottieri, who committed all kinds of atrocities in the territories which they scoured. Ambrosio Visconti, one of the numerous bastard sons of Bernabò, who was desolating the Abruzzi at the head of several of these bands, amounting to nearly 10,000 men, was defeated by the troops of Queen Joanna, united with those of the pope. Most of Ambrosio's men were killed, either in or after the fight, and 600 of them were taken prisoners to Rome: the pope caused 300 to be hung, and the rest were sent to Montefiascone, whence having attempted to escape, they were hung likewise. Similar scenes occurred in Lombardy and in Tuscany, where Florence, Pisa, and Siena were continually making incursions into each other's territories by means of the mercenary bands. And yet this is the age represented by some historians as one of independence and prosperity for the republics of Tuscany.

In 1368 Joanna, queen of Naples, and Peter, king of Cyprus, went to Rome on a visit to Pope Urban, who received them most kindly. In the month of April the emperor Charles IV. went to Italy with a large force, which was joined by the troops of the pope and of Queen Joanna, for the purpose of chastising Bernabò Visconti, who paid no more respect to the emperor than to the pope. But all these preparations ended in nothing; Charles signed a truce with Bernabò, some say after receiving from him a sum of money, dismissed most of his troops, and then proceeded through Tuscany to Viterbo, where he met the pope, and they proceeded together to Rome, where Isabella, Charles's wife, was crowned empress by the pope with great solemnity.

In the following year, 1369, John Palæologus, emperor of Constantinople, repaired to Rome, where he abjured those peculiar tenets of the Eastern church in which it differs from that of Rome, and acknowledged the supremacy of the pope over the whole Christian church. The great object of the journey of Palæologus was to obtain the assistance of the Western states against the Turks, in which however he did not succeed. The pope was not always at peace in his own dominions. He was obliged to send an army against the people of Perugia, who had revolted, and the people of Rome proved at times restive, which probably induced the pope to reside chiefly at Viterbo and Montefiascone. In 1370 Urban determined to return to Avignon. The reason alleged for this was to mediate between the kings of France and England, who were at war. But Petrarch, who greatly lamented this step, attributed it to the importunities of the French cardinals, who preferred the easy life which they used to lead in their own country, to the formality and discipline which were enforced at Rome. In the month of September the pope embarked at Corneto, and returned to Provence, but shortly after his arrival at Avignon he fell ill, and died in December of the same year. He was generally regretted for his personal character, his disinterestedness, charity, and pious zeal. He was succeeded by Gregory XI. A life of Urban V., in Latin, is inserted in the third volume of Muratori's 'Rerum Italicarum Scriptores.'

URBAN VI., Bartolomeo Prignano, archbishop of Bari, was elected, after a stormy conclave, in April, 1378, to succeed Gregory XI., who had again restored the Papal see to Rome. Of the sixteen cardinals who were at Rome, twelve were French and four Italian. The former wished for a French pope, but the people of Rome assembled tumultuously, crying out that they would have a Roman pope, and the magistrates of the city sent envoys to the cardinals in conclave assembled entreating them to elect, if not a Roman, at least an Italian pope. As none of the four Italian cardinals was thought fit for the office, it was at last agreed to elect the archbishop of Bari, a native of the kingdom of Naples, who happened to be at Rome at the time. But before his election was made known, the impatient populace broke into the hall of the conclave and the frightened cardinals ran away. The following day, 9th of April, peace being restored by the magistrates, the cardinals assembled again, and confirmed the election of the archbishop of Bari, who then accepted the Papacy, and assumed the name of Urban VI. He was solemnly crowned on the 18th of April, attended by the sixteen cardinals who were at Rome, and who communicated the news of the canonical election of the new pope to the other cardinals, who were still at Avignon, as well as to all the kings, princes, and republics of Christendom. There appears therefore to be no truth in the subsequent allegation of the French cardinals, who began the schism, that the election had not been free, and was a fiction arranged with the consent of Prignano himself, in order to escape from the violence of the Romans. It was not until the following July that the French cardinals, having one after the other left Rome on the pretence of the summer heats, assembled at Anagni for the purpose of revoking the election of Urban, and they invited the Italian cardinals to join their convention. One of the latter, Francis Tebaldeschi, cardinal of S. Pietro, fell ill, and died in the following August, after making a solemn declaration that Urban had been legally elected, and that he acknowledged him as the true successor of St. Peter. The true reason of the secession of the French cardinals, besides their original desire of having a French pope residing at Avignon, was that Urban, who had the character of an austere, zealous churchman, but destitute of all spirit of charity or conciliation, began his pontificate by assuming a harsh, haughty tone towards the cardinals, upbraiding them with their dissolute lives, their simoniacal practices, and threatening them with severe measures of reform, which were certainly wanted, but which, after the inveterate habits of relaxed discipline contracted during the long absence of the Papal court from Rome, could only have been effected gradually and with caution. As it was Urban by his intemperate conduct, instead of a reform effected a schism in the church. He also contrived to offend, by his imprudent words and uncourteous behaviour Joanna of Naples, his natural sovereign, who had sent her husband, Otho of Brunswick, with a splendid retinue to congratulate him on his exaltation. The consequence was that Queen Joanna, as well as King Charles V. of France, gave their countenance to the French cardinals at Anagni, who on the 9th of August declared Urban to be a usurper, and excommunicated him. On the 20th of September they elected as pope, Robert, cardinal of Geneva, a man notorious for his unclerical habits, and for the atrocities which he had committed at the head of the bands of foreign mercenaries in the Romagna, and especially at Cesena, a few years before. He assumed the name of Clement VII., but he is placed in the list of antipopes, for although Urban's subsequent conduct was far from laudable, there is no doubt of his having been legally and canonically elected.

Pope Urban, seeing himself forsaken by all his cardinals, for even the few Italian cardinals had left him, promoted twenty-six ecclesiastics, mostly persons of merit, to the rank of cardinal, and excommunicated the others as rebels against the head of the church. Thus began the great Western schism, as it is called, which lasted nearly half a century, and was the occasion of the famous Council of Constance. France, Savoy, and Naples sided with the antipope Clement; the rest of the Catholic world with Urban. Both issued bulls and decretals; both conferred livings and sees, causing thereby great contention and confusion in church and state. Clement took up his residence at Avignon. Urban remained at Rome, where, in 1379, he proclaimed a crusade against the antipope and Queen Joanna, and took into his pay the mercenary troop called the Company of St. George, commanded by Alberico da Barbiano, an Italian condottiere, who defeated near Marino, in the Campagna, the Breton company or troop in the service of Queen Joanna. In the following year Pope Urban deposed the queen, by a bull, as being schismatic, heretic, and guilty of high treason, and released her subjects from their allegiance. He also excommunicated and deposed the archbishop of Naples for having acknowledged the antipope, and he appointed another in his place. Lastly, he wrote to Louis, king of Hungary, and offered him the kingdom of Naples. Louis, being old, gave up his claims to his cousin Charles of Durazzo, who, having raised an army in Hungary, went to Italy in 1381, and after being crowned at Rome by Pope Urban, marched to Naples, which he occupied without much fighting, and took Queen Joanna prisoner, and some time after put her to death. Urban had stipulated with Charles that he should give to Francis da Prignano, surnamed Butillo, the pope's nephew, the duchy of Capua, with Nocera, and other territories; and as Charles, now settled in the throne of Naples, delayed performing his promise, the pope set out for Naples, and saw his nephew put in possession of his duchy in 1383. From Naples Urban went to Nocera, where he remained for a long time with no apparent object. There he had disputes with King

Charles, and also with the cardinals of his retinue, who, tired of their uncomfortable and forced residence at Nocera, began to express their opinion of the wayward obstinacy and strange caprice of the pontiff. A series of questions were published about that time by Bartolino, a jurist of Piacenza, about the propriety of appointing curators to he pope in case he showed neglect or incapacity in the performance of the duties of his high office. It was reported to Pope Urban that six of his cardinals had discussed these questions and held the affirmative, and in act that there existed a conspiracy to arrest him and condemn him as a heretic. Urban became furious at this eport, which appears to have been greatly exaggerated; nd in January, 1385, he had the six cardinals seized and oaded with chains, and gave them in charge to his ephew Butillo, who put them to the torture. One of hem, the bishop of Aquila, was induced, by the acuteness f the pain, to acknowledge all that he and his colleagues were accused of. Meantime the pope, dissatisfied that King Charles still kept a garrison in the fortress of Capua, which place had been given to Butillo, the pope's nephew, eproached him for not fulfilling this and other conditions f the investiture, and threatened to resume the kingdom s a fief of the Roman see. King Charles sent a force, nder the great constable of the kingdom, to besiege Nocera, upon which the pope excommunicated Charles, nd he used to show himself daily on the town-walls, and hen at the sound of a bell he loudly repeated his anahemas against Charles and against his troops that were ncamped around the town. At last the pope was relieved rom siege by Sanseverino and other barons, and escorted o the coast of Pæstum, where he embarked on board a Genoese squadron which lay in waiting, and went to Genoa, taking along with him the cardinals as prisoners, xcept the bishop of Aquila, who died or was put to death on the road. The others were privately put to death by Urban's order in Genoa; some say that they were drowned n sacks, others that they were strangled in his own palace. The citizens of Genoa were highly offended at this abuse of authority, and Urban left Genoa for Lucca, where he spent the Christmas of 1385. Meantime Charles of Durazzo was murdered in Hungary, whither he had gone to claim that crown, and his infant son Ladislaus was proclaimed at Naples. He had a competitor in Louis II. of Anjou. Pope Urban, being applied to by the queen-dowager, countenanced the claims of Ladislaus, whilst Louis of Anjou was supported by the antipope Clement, who gave him the investiture at Avignon. The kingdom was divided between the two parties. Pope Urban, having raised troops, removed from Perugia, where he then was, o Ferentino, near the frontiers of Naples, but on the way he fell from his mule and was much bruised. He was carried to Rome, and died in October, 1389. His violence, which bordered upon frenzy, his excessive pride, his obstinacy, his cruelty, his worldliness, disgraced his pontificate, and were the cause of many crimes and many calamities. His character and doings bear considerable resemblance to those of Boniface VIII. Theodore von Niem, who was Urban's familiar and an eye-witness of his deeds t Nocera, has given many particulars in his 'Historia de chismate sui temporis.' Thomas, bishop of Acerno, wrote Opusculum de creatione Urbani VI.' Muratori, in his Annals of Italy,' gives several other authorities for his account of Urban's pontificate. He was succeeded by Boniface IX.

URBAN VII., Gio. Batista Castagna, born at Rome, of Genoese family, was elected after the death of Sixtus V., n September, 1590, and died a few days after. Gregory XIV. was then elected in his place.

URBAN VIII., Cardinal Maffeo Barberini, succeeded Gregory XV. He was born at Florence in 1568, of a oble family, and after studying with great success at Rome, where his uncle Francesco Barberini filled an office n the Papal administration, he was promoted successively o several important offices, was made referendary of justice, protonotary of the Papal court, legate in France to Henri IV., cardinal bishop of Spoleto, legate of Bologna, nd lastly pope, and was crowned in September, 1623. He isplayed from the beginning of his pontificate a liberal mind, being generous, affable, fond of literature, and of classical studies, in which he was well versed, and well acquainted with state affairs. He found the court of Rome involved in the tedious and perplexing affair of the Valtellina, which, from being originally a war of religion between the inhabitants of that country and the Grisons, had become an intricate political question, in which the courts of France, Spain, Austria, Savoy, and Rome took a lively part, and which endangered the peace of Europe. [VALTELLINA.] Urban, whose policy was rather comprehensive than narrow, was not inclined to add to the already overgrown Spanish power in Italy, and he leaned rather to the side of France, but he was obliged to manœuvre and conceal his real sentiments, until the treaty of Monçon, in March, 1626, between France and Spain, set the question at rest, at least for a time. The next affair of importance was that of the duchy of Urbino, a fief of the Roman see, whose duke, Francesco Maria II. della Rovere, was nearly eighty years old, and had lately lost his only son, who left no male issue. Pope Urban induced the duke to make a donation, 'inter vivos,' of his duchy to the see of Rome, after securing for himself a competent income. Thus that fine country, which stood between the Papal provinces of the Marches and Romagna, was incorporated with the Papal state in 1626. Next came the war about the succession to the duchy of Mantua, between the emperor Ferdinand and the court of Spain on one side, and the French on the other, which lasted several years, and which spread desolation all over North Italy and brought in the plague into Lombardy. Pope Urban endeavoured repeatedly to restore peace to Italy, but did not succeed till 1631, by the treaty of Cherasco, concluded between the king of France, the duke of Savoy, and the emperor. Meanwhile the great war, called 'the Thirty Years' War,' was raging in Germany, and Gustavus Adolphus, at the head of the Protestant party, was in the full tide of success. Italy began to feel alarmed, and several princes urged Pope Urban to assist the emperor by all the means at his disposal as the head of the Catholic world. Urban however showed himself rather cool on the subject; he did not feel very friendly towards the house of Austria since the war of Mantua, and once in full consistory he imposed silence on and ordered away Cardinal Borgia, the Spanish ambassador, who was remonstrating loudly with him on his duties as pontiff.

In 1633 Giacinto Centini, nephew of Cardinal Centini of Ascoli, wishing to see his uncle pope, betook himself to sorcery in company with other infatuated men, in order to effect the destruction of Urban. The absurd conspiracy being revealed, the judges, who themselves believed in magic, made it a capital case: Centini was beheaded, others were burnt, and others sent to the galleys. In the same year, Galileo, being summoned to Rome by the court of the Inquisition, was obliged to abjure solemnly his solar system, after which he was allowed to return to his country-house near Florence. In 1635 war broke out again in Italy between the French and the dukes of Savoy and of Parma on one side, and the Spaniards, who ruled in Lombardy, on the other. Pope Urban, in order to allay the storm, sent to Paris the nuncio Giulio Mazzarino, a young man of abilities, who was then pushing forwards in the world. This embassy was the beginning of the extraordinary fortune of Mazzarino, for Cardinal Richelieu found him to be a man after his own mind, and took him into his confidence; but the ostensible object of Mazzarino's mission, that of peace-making, was forgotten or set aside, and the war continued in North Italy.

In 1642 the Papal state itself was the scene of a petty war. Odoardo Farnese, duke of Parma, was possessed also of the duchy of Castro and Ronciglione, a fief of the Roman see. The Barberini, nephews of Pope Urban, were at variance with the duke upon matters of precedence, and they also wished to have the duchy of Castro for their own family. The duke made preparations for defence. The Barberini persuaded their uncle, who was old and infirm, to take military possession of the duchy of Castro. The duke of Parma made a defensive alliance with the duke of Modena, the grand-duke of Tuscany, and the republic of Venice, against the ambition of the Barberini, who, disposing at their pleasure of the Papal treasury and influence, had moved an army to the northward to attack the state of Parma. Several combats took place on the banks of the Po between the Papal troops, commanded by Cardinal Antonio Barberini, and the troops of Modena and Venice. The troops of Tuscany also took part in this desultory but destructive warfare, which lasted till 1643, when by the mediation of France peace was made and

Pope Urban promised to restore the duchy of Castro to the duke Farnese on the latter making an humble apology. Vittorio Siri wrote a diffuse history of this war, called 'Guerra di Castro.'

On the 29th of July, 1644, Pope Urban VIII. died, after a pontificate of nearly twenty-one years. He was succeeded by Innocent X. Urban encouraged learning and the arts; he founded the college of Propaganda; he completed the aqueduct of the Acqua Felice; built the country residence of Castel Gandolfo, enlarged and embellished the Quirinal palace, and increased the Vatican library. He was himself a good classical scholar, and no mean Latin poet. The principal charge against him is his weak partiality towards his nephews, who abused his old age and credulity. (Muratori, *Annali d'Italia;* Botta, *Storia d'Italia.*)

URBANIA. [PESARO E URBINO.]

URBI'NO, a town of the Papal state, in the administrative province of PESARO E URBINO, is situated partly on a hill which is an offset of the Tuscan Apennines, dividing the valley of the Metauro from that of the Foglia. It is about 20 miles from the coast of the Adriatic. Urbino is a walled town, and has several fine buildings, among others the ducal palace, now the government-house, of very good architecture, which contains a collection of antient inscriptions and sculptures, the palace Albani, the cathedral, and several other churches and convents. Urbino is an archbishop's see: it has a college, an academy of sciences and literature, and about 4500 inhabitants. They show at Urbino the house in which Raffaelle was born. (Calindri, *Saggio Statistico dello Stato Pontificio;* Rampoldi, *Corografia dell' Italia.*)

Urbino was for three centuries the capital of a principality with the title of duchy, and some of its dukes figure in a conspicuous manner in the history of Italy, especially as patrons of learning. The court of Urbino was at one time the most refined in Italy. The family of the counts of Montefeltro founded the dukedom of Urbino in the fourteenth century. Guidobaldo, the last of the Montefeltro line, having no sons, adopted Francesco Maria della Rovere, nephew of pope Julius II., who succeeded him as duke of Urbino in 1508. In 1626 his descendant, Francesco Maria II., being old, and his only son having died without male issue, gave up his dominions, which were a fief of the Roman see, to be incorporated with the Papal state, agreeably to a written cession which he made to Pope Urban VIII. The duchy of Urbino comprised the towns of Pesaro, Fano, Fossombrone, Sinigaglia, Gubbio, Cagli, San Leo, Castel Durante, since called Urbania, and about 300 villages or hamlets scattered over a very pleasant territory.

Urbino is the birthplace of Raffaelle, Bramante, Barocci, and other distinguished artists; of the military engineer Paciotti; of Bernardino Baldi, Fabretti, and other men of learning; and of Pope Clement XI., and several cardinals of the Albano family.

URBINO E PESARO. [PESARO E URBINO.]

U'RCEOLA, a genus of plants of the natural family of Apocynaceæ, so named by Dr. Roxburgh from *urceolus,* 'a pitcher,' in consequence of the form of its corol. The genus Urceola is confined to the Malayan peninsula, and the islands of Sumatra and Penang; but as it is by some botanists considered not to differ from the Vahea of Madagascar, the genus may have a wider distribution. It has the calyx small, 5-partite. Corol urceolate; tube elongated, ventricose, 5-cleft. Stamens 5, anthers sagittate. Follicles 2; seeds numerous, glabrous. The species *U. elastica,* or Caoutchouc-vine, is shrubby and twining, climbing over trees to a great extent, sometimes as much as 200 paces; with oval opposite leaves, and terminal panicles. From wounds made in the bark of this plant there oozes out a milky fluid, which on exposure to the open air separates into an elastic coagulum, and watery liquid apparently of no use. After the separation takes place, this coagulum is not only like American caoutchouc, or Indian-rubber, but possesses all the same properties as first ascertained by Dr. Roxburgh. (*Asiat. Res.*, v. 171.) He states that a ball of it externally has the appearance of American caoutchouc; when cut into, it is of a light brown colour, till the action of the air darkens it. This ball, measuring 9¼ inches in circumference, and weighing 7½ ounces, in simply falling from a height of 15 feet, rebounded about 10 or 12 times, which is of itself an indication of the goodness of the caoutchouc. Dr. Roxburgh also found that slips of it were capable of bearing a greater degree of extension and contraction than the American. When they broke, the elasticity was so great, that each end returned to its respective mass. The least pressure with the finger and thumb united different portions as perfectly as if they had never been separated: this property of caoutchouc has been considered a much more modern discovery.

This plant was first discovered by Mr. Howison, a surgeon, who states, in the same volume of the 'Asiatic Researches,' that, in cutting their way through the underwood of Penang, they were much surprised on finding their cutlasses covered with a substance which had all the properties of American caoutchouc. Mr. Howison says that the milk which is obtained by making incisions into the stem yields about two-thirds of its own weight of caoutchouc. It is curious to observe how many of the modern applications of this remarkable substance were anticipated by this gentleman, such as the making of waterproof boots, the coating of gloves and stockings with the juice, &c.; as he says, 'Besides an effectual clothing for manufacturers employed with the mineral acids, which had long been a desideratum, this substance under different modifications might be applied to a number of other useful purposes in life, such as making hats, greatcoats, boots, &c. for sailors, soldiers, fishermen, and every other description of persons who from their pursuits are exposed to wet stockings; for invalids who suffer from damps; bathing-caps, tents, coverings for carriages of all kinds, for roofs of houses, trunks, buoys,' &c. (*Asiatic Res.*, v., p. 164, 1798.)

URCEOLA'RIA, a genus of crustaceous Lichens, belonging to Feé's family Lecanoreæ. The characters of this genus are as follows: thallus crustaceous, spreading, adnate, uniform; the apothecia, reproductive organs, are orbicular, with the disk concave, coloured, and immersed in the crust; the border of the apothecium is formed of the crust, and has the same colour. Hooker, in his 'British Flora,' enumerates six British species of Urceolaria. They are generally found on rocks, and stones and walls. Two of the species, *U. scruposa,* the common, and *U. cinerea,* the grey Urceolaria, are used for dyeing. The *U. Acharii* is frequently of a pale brick colour, sometimes dark, and differs little from *U. cinerea* but in this respect; Hooker attributes its colour to the oxide of iron, which it takes up in the places where it grows. This agent is found also to tinge other species that grow in the same districts. A species called *U. esculenta,* a native of Tartary, is used as an article of diet.

URCHIN, SEA. [ECHINIDÆ.]

U'REA is a principle proper to the urine of man and quadrupeds, and perhaps of all animals. It was first detected by Rouelle, and afterwards more fully examined by Fourcroy, Vauquelin, and Prout. In its solid and pure state, urea crystallizes in the form of long prismatic needles, which are white, transparent, having somewhat the lustre of mother-of-pearl, with a taste approaching that of nitre, and none at all of the fluid which furnishes it. It is neither sensibly acid nor alkaline. The specific gravity of the crystals is 1·35. It fuses at 250° into a colourless fluid, and at a higher temperature is converted into ammonia, cyanite of ammonia, and dry solid cyanuric acid. It is soluble in its own weight of cold water, and still more soluble in hot water. Alcohol of specific gravity 0·816 dissolves one-fifth of its weight of urea at 60° Fahr. It is very sparingly soluble in æther and turpentine. The caustic alkalis decompose urea, and with the assistance of heat convert it into carbonate of ammonia. The nitric and oxalic acids combine with urea, forming salts more or less insoluble.

The following process is, perhaps, the best for procuring this principle in a separate form:—Evaporate urine to the consistence of a strong syrup, and then add pure concentrated nitric acid, until the whole mass becomes more or less solid. The crystalline matter which is now observable consists of nitrate of urea. This must be washed from adherent impurities in ice-cold water, and then pressed between bibulous paper to dry. These crystals are now to be dissolved in lukewarm distilled water, and neutralised with carbonate of barytes. This mixture is to be evaporated to dryness, and alcohol boiled on the dry mass. In this way the urea may be extracted from the barytic salts. It may be obtained in colourless crystals, by digesting the alcoholic solution with animal charcoal, then filtering, and allowing the urea to crystallize by spontaneous evaporation of the alcohol.

(*Analysis of Blood and Urine*, by G. O. Rees; *On Stomach and Urinary Diseases*, by Dr. Prout, p. lxxii., 3rd edition; and Turner's *Elements of Chemistry*, Part iii., p. 758, edited by J. Liebig and W. G. Turner.)

URE'DO (from *uro*, to burn), a genus of Cryptogamic plants belonging to the natural order of Fungi, and to the division Hypodermii of Fries. Included in this division are also the genera Æcidium, Puccinia, Podisoma, and Gymnosporangium. This division of plants is important and interesting, both in a botanical and economical point of view. These productions are interesting to the botanist, as they seem to stand on the verge of the vegetable kingdom, or that point where the individuality of a lower organic being is lost in its dependence on a higher. Viewed economically they are of the utmost importance, as producing or being indicative of the fatal diseases of corn, known by the names of smut, brand, bunt, rust, mildew, blast, brand-dew, dust-brand, scorch-blast, brand-bladders, pepper-brand, canker-brand, burnt-ear, &c.

All the *Hypodermii* (from ὑπό, 'under,' and δέρμα, 'skin') are known by having their sporidia, or spore-cases, free or stipitate, and situated beneath the cuticle of living plants. On examining any one of the productions thus constituted, it will be found that the part of the plant on which they are placed has lost its natural colour and other characters. The cuticle, under which they grow, is discoloured, frequently raised, and bursts in the process of time. The bodies called sporidia, which constitute these productions, are cellular bodies, having an ovoid or elliptical form, and are frequently seated on a kind of receptacle. The tissue around these bodies is frequently modified in character and appearance, sometimes approaching that of the bodies themselves. The sporidia, or cells, are generally filled with granules, which are supposed to be the sporules of the plant. Having these appearances, many botanists have denied that these cells furnished with interior granules are truly individual plants, but that they are transformed cells resulting from disease in the tissue in which they occur. Fries, who has paid more attention to cryptogamic plants than any other writer, defines the *hypodermii* as plants having no proper vegetation, the sporidia arising from the anamorphosis of the cells of living vegetables. Unger, a German botanist, has also written a very elaborate work on the nature of these subcutaneous fungi, in which he traces their origin to a development of tissue in plants under the influence of disease. He calls them the *exanthemata* of plants, and attributes their formation to a diseased condition of the stomates, which he calls the organs of respiration of plants. He says they are always produced by external circumstances that would derange the function of stomates; and, by a lengthened series of observations on a large number of species of these plants, he found that the development of the diseased tissue always commenced in the tissue under the stomates. The external circumstances which he found most favourable to the development of these productions, were:—1, a very humid state of the atmosphere, long-continued; 2, an epidemic state of the atmosphere, in which these bodies are produced over large districts; 3, a want of sufficient light; 4, alternations from hot to dry and moist weather; 5, long-continued hot and dry weather; 6, a want of a due supply of air; 7, the cuticle becoming covered with dust, &c.; 8, accidental mutilations; 9, change of climate; 10, undue supply of moisture. There is no doubt that under all these circumstances the bodies in question are most abundantly produced, but the question as to whether the cells with granules are individual plants or diseased tissue cannot thus be settled. Is there any evidence to prove that the granules contained in the cells are capable of producing other cells? As this is an important practical point, we shall quote the evidence that is brought forward in support of this view. If the granules are capable of reproducing the cells, then the cells must be regarded as the sporidia, and the granules as sporules of a plant which has an independent existence. Bauer instituted a series of experiments, in which he diffused the granules of a Uredo in water, and poured it over the soil in which wheat was growing, and it was found that the wheat became attacked with Uredo. Fée 'collected some leaves of a Rosa centifolia, which were entirely covered with Uredo rubigo: he took three rose-trees of the same species, the leaves of which showed no trace of Uredo, and having put them in separate boxes, removed them from the neighbourhood of the affected plant, but still kept them in a similar aspect. One part of the rose-leaves covered with the Uredo was mixed towards the end of the winter with the mould in the box of one of the rose-trees, and the remainder subsequently used in the manner to be detailed. When the second tree was in full vigour and near blossoming, some of the affected rose-leaves were frequently shaken over the soil to detach the sporules of the fungi, the remaining portion of which continued attached to the leaves. The branded rose-leaves were then steeped in water, and the third rose-tree watered with the mixture during the whole of the spring. The three insulated plants exhibited nothing particular until the autumn: then the rose-tree in whose soil the brand-bearing leaves had been mixed became profusely covered with the Uredo, the other two still remaining free; but the succeeding season the whole three plants were branded with myriads of Uredines.' These experiments seem to prove that the Uredo has the power of reproducing itself, and that the means by which the sporules are introduced into the plant are its roots. It is not however improbable that they may sometimes be introduced to the plant through the stomates, and thus account for Unger's observation of their constant presence in this part of the plant. Although there seems to be little doubt from the above and other experiments that the sporules of these fungi may be introduced into plants by the soil, yet there can be no doubt, from the observations of Unger and others, that when plants are in a state of disease produced by external circumstances the fungi are developed most rapidly and in greatest numbers; and indeed it is a question altogether as to whether some disordered action of the tissues of the plant does not always occur previous to the development of any of the species of fungi.

The species of the genera of Puccinia, Æcidium, and Uredo are exceedingly numerous. In fact they seem to vary with every plant they attack, and have thus given rise to specific names according to the plants on which they are found, as Puccinia Primulæ, Æcidium Berberidis, Uredo Violarum, &c. This fact might lead to the supposition that many of these recorded species are merely varieties produced by the same sporules being developed in different plants. Few experiments have been made on this subject, although some late inquiries of Professor Henslow have proved the identity of two species, before supposed to be remote, viz. Puccinia graminis and Uredo rubigo. He also states his belief that two other species, Uredo Rosæ and Aregma mucronata, are identical. The Uredo rubigo is the species which produces the disease called rust, whilst the Puccinia graminis [Puccinia] is found on plants affected with mildew. The distinction between Uredo and Puccinia is that the latter possess pedicels and its sporidia are elliptical, whilst those of Uredo are round, without pedicels. In specimens of blighted wheat Henslow found both these forms of sporidia, and not only what were supposed the peculiar forms of each genus, but all intermediate ones. Previous to this observation the two forms of sporidia were frequently found together, but were thought by Berkeley and others to be still separate plants.

As the diseases of corn indicated by these fungi are of most importance, we shall describe these particularly. Under the head of Burnt-Ear, a diseased state of wheat in which the *Uredo segetum* (*U. carbo*, De Cand.) appears, this disease, which is also known by the names of smut and dust-brand, has been described.

Uredo Caries, De Cand. (*U. fœtida*, Bauer), is found on wheat: the sporidia are included within the ovary of the fruit, the sporidia are exactly spherical, rather large, globose, and black. When this plant appears on wheat it is said to have the Bunt, Smut-balls, or Pepper-brand. The sporidia may be detected in the young seed in the very earliest states of the flower-bud, and when perfectly ripe it occupies the whole interior of the grain, but does not burst the skin, so that the grain retains the character of being perfectly sound. The sporidia are frequently mixed with delicate fibres, which seem to constitute the mycelia of the plant. Henslow calculates that a single grain of wheat may contain more than 4,000,000 of sporidia. Each of these sporidia probably contains millions of sporules, hence some idea may be formed of their minuteness, as well

Urate of Soda.—According to Dr. Wollaston, gouty concretions consist principally of this salt. It may be prepared in the same way as urate of potash; the reaction is similar. It is also formed when uric acid is boiled with borax.

URINARY CALCULI. [CALCULI.]

URINARY ORGANS. [KIDNEYS.]

URINE is a fluid secreted from the blood by the kidneys. Every excretory organ performs some special office: the lungs clear the system of its excess of carbon; and the kidneys purify it of azote and saline matter. Besides secreting a peculiar azotic substance, the kidneys have an oxygenating power, for the sulphur, phosphorus, calcium, &c. of the blood are changed to acids and oxides, or earths, by the glandular energy of these organs. This secretion is of a very varied character, and, from the variety of the substances extracted from the body through the medium of the kidneys, the urinary system may properly be regarded as the emunctory of the entire animal economy, in which we meet with every principle and constituent that analysis has discovered forming the solids and fluids of the body. A knowledge of the urine in health, and of the variations to which it is subject in disease, is of the utmost importance to the medical practitioner; the different appearances of this fluid frequently indicating not merely the state of the urinary system, but the changes which have taken place in other parts of the animal economy. It is not however until a comparatively recent period that this secretion has received from the profession the attention which it deserves. In former times, the Uromantes, or Urine-casters, pretended to be able to describe, from the appearance of the urine only, the nature of the disease under which a patient laboured, and by thus practising on the credulity of mankind made the subject of the urine a source of imposition and gain. The examination, or rather inspection of the urine, was abandoned in great measure by regular practitioners, and confined to illiterate charlatans. Since the year 1777, when Scheele discovered the existence of uric acid, the attention of the most enlightened chemists has been bestowed on this fluid, and at the present time the constituents of healthy urine are well known, as well as most of the changes to which it is liable in disease.

The urine of a healthy person when recently voided is acid, transparent, usually of a pale amber or straw-colour, a brackish taste, peculiar odour, and of a specific gravity varying from 1·010 to 1·030. The character of the urine however is apt to be altered by a variety of circumstances: it differs, for instance, according to the time of the day at which it is passed, whether before or after a meal, and according to the quantity and quality of the food and drink consumed. Urine has therefore been divided into two kinds, that of assimilation, and that of the blood. The urine of the blood is that voided at a considerable time after food has been taken, when the process of digestion is complete, and the chyle has entered the blood: it has the properties of urine in an eminent degree, and from it we are enabled to learn the state of the kidneys and system in general. The urine of assimilation varies, being sometimes limpid and colourless, when a great quantity of fluids has been taken; at other times, after a full and solid meal, of a deep colour, and becoming turbid on cooling. By the urine of assimilation we judge of the state of the digestive organs.

The character of the urine is affected by the seasons; in winter the kidneys are excited to greater activity than in summer, nor is the reason of this difficult of explanation. All the emunctories of the body act, as occasion may require, as mutual suppeditories: now in cold weather the perspiration is more or less suppressed; and were it not that the action of the kidneys was increased, we should be liable to plethoras, or repletions of the most dangerous nature. Hence it happens that when the perspiration is abundant, the urine is scanty and high coloured, and contains a strong impregnation of saline ingredients; when the perspiration is checked by any cause, the urine is copious, limpid, and its proper salts more diluted. The state of the mind has also a great influence on the urine: any sudden shock usually increases the quantity of this fluid, and it is then almost without odour or flavour, like water.

The colour of the urine of persons in health is usually of a pale amber colour, becoming slightly turbid towards the centre, seven or eight hours after having been passed, and shortly depositing a sediment, that rises up in the form of a cone from the centre of the fluid. This deposition, which at first is in small quantity, increases until putrefaction renders the whole of the urine turbid. We are still in great uncertainty as to the properties of the principle on which the colour of the urine depends; it is doubtful whether chemists have succeeded in isolating the colouring principle of the urine, and whether it has ever been examined free from foreign admixture. The colour of urine varies, and it is essential to distinguish whether the variation be owing to the food that may have been taken, or to any medicine that has been administered. Urine, for example, becomes almost colourless if much drink has been swallowed; red after a heating diet, long fasting, the use of water-cresses, beet, sorrel, and madder; it is tinged blackish by chalybeates; yellow by saffron, turmeric, and rhubarb: the astringent principle of galls and other substances containing tannin is detected in the urine by this fluid assuming a bluish or greenish tint on any of the salts of iron being added to it. In short, no secretion is more variable in its physical attributes than urine.

The state of the body greatly modifies the colour of the urine. We know, for instance, how limpid, colourless, and watery it becomes after any spasmodic paroxysm, and in the cold stages of agues; turbid, yellowish, and mucous at the termination of pituitous or catarrhal affections; golden yellow and turbid, in jaundice; turbid, and accompanied with deposition of mucus, in catarrhal affections of the bladder. Colourless, limpid urine, resembling spring water, is called nervous urine. The urine is clear and insipid in spasmodic affections, in hysteria, hypochondriasis, and epilepsy. It is equally transparent, but usually very abundant, in diabetes. The urine is of the colour of brick-dust, and turbid, in almost all intermittent fevers, in certain dropsies, in rheumatism, gouty affections, scurvy, atrophy, and some kinds of stone. The urine is of an orange-yellow colour, or saffron-yellow, in bilious diseases; but the yellowness is of a much deeper hue in symptomatic jaundice than in critical febrile or simple critical jaundice. Urine has been voided of a jet-black colour, instances of which are related by Dr. Marcet and the late Dr. Babington. In pregnancy there is a peculiar sediment resembling flakes of wool or cotton, which has received the name of *kiestine*. It is whitish, opaline, slightly granular, and resembles very much the layer of fat which swims on the surface of fat broth when cooled.

The odour of healthy urine is somewhat aromatic, without acidity, ammoniacal smell, or fetid taint, and resembles in a great degree the odour of the perspiration of a healthy man. The urine of persons affected with stone in the bladder often acquires a highly offensive odour, and the urine of diabetic patients has usually a sweet wheyey smell; indeed their whole persons exhale a similar odour. Certain substances when eaten, or even when respired, impart a peculiar odour to the urine. Garlic and other strong-smelling substances impart their peculiar odour to the urine, and the odorous principles of asparagus, cauliflowers, fennel, juniper berries, valerian, castor, balsam of Peru, copaiba, cubebs, and many other substances, likewise pass through the blood into the urine. In persons of delicate constitution, and those of a weak digestion, we can often recognise by the odour of the urine the nature and character of the food they have eaten.

Healthy urine is always acid; it becomes ammoniacal only by a prolonged exposure to the atmosphere, for it remains perfectly unchanged if kept in a vessel well stopped. Its ammoniacal transformation is owing to the spontaneous decomposition of the urea. It appears that this conversion may even take place in the kidneys under the influence of disease, especially in putrid and other adynamic fevers: then the urine is alkaline as it passes from the bladder, and proportionally so as it contains less urea. Litmus-paper is the best immediate test for detecting acidity in urine. When the urine is acid, the blue colour of the paper is changed to a red. Turmeric-paper, or reddened litmus-paper, is the best test for ascertaining whether urine be alkaline or not. Alkaline urine turns the yellow colour of the turmeric-paper brown, and changes the colour of the red litmus-paper to a blue: this latter is a much more delicate test than the former.

In health the quantity of urine passed in twenty-four hours is subject to variation from the temperature, diet, and exercise of the individual, as well as other circumstances, and it is therefore impossible to fix a standard aplicable to every case. Haller estimated the quantity oided in twenty-four hours to be as high as 49 ounces; tye considered 40 ounces an average quantity in the same ime; whilst Dr. Prout says that, if we consider that the uantity varies in this country from 30 ounces in the sumner to 40 ounces in the winter, we should probably be very ear the truth as regards a person in good health, and who oes not drink more than nature requires.

The specific gravity of healthy urine varies in diferent individuals from 1·010 to 1·030. The late Dr. ames Crawford Gregory found the mean specific gravity f urine in fifty apparently healthy subjects in Edinburgh, uring the months of September, October, and November, t two o'clock in the day, to be 1·02246. Dr. Prout conaiders that, if we estimate the average specific gravity to ange from 1·015 in the winter to 1·025 in the summer, we shall be near the truth.

The following table was constructed by Dr. Henry for scertaining, without the trouble of evaporation, the quantity of solid extract contained in the pint (16 ounces) of rine of different specific gravities from 1·020 to 1·050:—

Specific Gravity at 60° F.	Solid Extract in a wine pint, in grains.	Solid Extract in a wine pint, in ounces.			
		oz.	drs.	scr.	grs.
1·020	382·4	0	6	1	2
1·021	401·6	0	6	2	1
1·022	420·8	0	7	0	0
1·023	440·0	0	7	1	0
1·024	459·2	0	7	1	19
1·025	478·4	0	7	2	18
1·026	497·6	1	0	0	17
1·027	516·8	1	0	1	16
1·028	536·0	1	0	2	16
1·029	555·2	1	1	0	15
1·030	574·4	1	1	1	14
1·031	593·6	1	1	2	13
1·032	612·8	1	2	0	12
1·033	632·0	1	2	1	12
1·034	651·2	1	2	2	11
1·035	670·4	1	3	0	10
1·036	689·6	1	3	1	9
1·037	708·8	1	3	2	8
1·038	728·0	1	4	0	8
1·039	747·2	1	4	1	7
1·040	766·4	1	4	2	6
1·041	785·6	1	5	0	5
1·042	804·8	1	5	1	4
1·043	824·0	1	5	2	3
1·044	843·2	1	6	0	3
1·045	862·4	1	6	1	2
1·046	881·6	1	6	2	1
1·047	900·8	1	7	0	0
1·048	920·0	1	7	1	0
1·049	939·2	1	7	1	19
1·050	958·4	1	7	2	18

In order to ascertain the quantity of solid matter in 16 fluid ounces of urine of a given specific gravity, it is only necessary to refer to the above table.

Berzelius, whose analysis of urine is still considered the most complete, describes the following substances as entering into its composition, viz.—in 1000 parts of healthy urine:—

Animal and destructible principles.	1. Water	933·00
	2. Urea	30·10
	3. Lithic acid	1·00
	4. Free lactic acid, lactate of ammonia, and animal matters not separable from them	17·14
	5. Mucus of the bladder	0 32
Alkaline and earthy salts.	6. Sulphate of potash	3·71
	„ soda	3·16
	7. Phosphate of soda	2·94
	„ ammonia	1·65
	8. Muriate of soda	4·45
	„ ammonia	1·50
	9. Earthy phosphates, with a trace of fluate of lime	1·00
	Silex	0·03
		1000·00

In addition to these matters, which constantly exist in healthy urine, the fluid occasionally contains a variety of other substances, as sugar, bile, albumen, fibrin, fat, blood, &c. The following is a tabular view of the matters found in urine, in addition to those specified in the above table:—

10. Albumen.
    Fibrin.
    Red particles.
11. Various acids, colouring-matters, &c., formed from or accompanying the lithic acid.
    Nitric acid.
12. Xanthic oxide.
13. Cystic oxide.
14. Sugar.
    Oxalic acid.
    Carbonic acid.
15. Hippuric acid? Benzoic acid?

We shall proceed to notice most of these substances separately in their special relation to urine.

Water is the basis of all animal fluids, and forms a very large proportion of urine. Sometimes an increase of the watery portion takes place, whilst the other principles remain the same, or become diminished. In this state of the urine, the urea and the salts bear to each other nearly their ordinary proportion, but are considerably deficient in their absolute quantity. Sometimes the increased flow of urine, as Dr. Prout observes, involves an increased proportion of a natural ingredient, as of urea, or of unnatural ingredients, as of albumen or sugar. On the other hand, the proportion of water is not unfrequently diminished below the natural standard, as in various forms of urinary suppressions; and sometimes, when the cause of this suppression is mechanical, the urine is simply diminished in quantity, whilst its composition remains the same. At other times the suppression is connected with deranged action of the kidneys, and while the proportion of water is diminished, the other ingredients are relatively much increased, as in various forms of gravel and calculus.

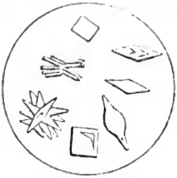
Urea, the chemical properties of which have been already described [UREA], is the principal solid element of the urine of mammalia. There is sometimes an excess of urea in the urine, and this excess may exist without or with an increase of the watery portion of the urine. In the first form, observes Dr. Prout, 'the quantity of urine passed seldom much exceeds the healthy standard, and in this case the quantity of urea is both absolutely and relatively greater than in health. In the second form, the quantity of urine is sometimes excessive, and in this instance the quantity of urine, in a given specimen of urine, may be less than in health, though the quantity of urea relatively to the other ingredients may be greater than natural, and the absolute quantity of urea passed in a given time may thus, as in the first form, exceed the natural standard.' Urine containing an absolute excess of urea is of high specific gravity, varying from 1·015 to 1·030, acid, prone to decomposition, and usually becomes alkaline. The mode which Dr. Prout commonly employs to detect an excess of urea is to put a little urine into a watch-glass, and carefully add to it nearly an equal quantity of pure nitric acid, in such a manner that the acid may easily subside, from its greater specific gravity, to the lower part of the glass, and allow the urine to float above it. If spontaneous crystallization takes place, an excess of urea is indicated; and the degree of excess can be inferred, nearly enough for practical purposes, by the greater or less time which elapses before the crystallization takes place, and which may vary from a few minutes to two or three hours. Such urine is commonly, but not always, of a pale colour. We find in many of the most important diseases connected with the urinary system great diminution, both absolute and relative, of the quantity of urea ordinarily existing in urine; the urine in these cases is usual limpid and colourless, and is passed in large quantities by nervous, hysterical persons or those advanced in years.

Uric Acid invariably exists in healthy urine, and can be easily precipitated by the addition of any acid. As the production of this acid in the system is intimately connected with the nature of the food and the powers of digestion, deposits of this acid, as might be expected, are of frequent occurrence. This acid is either deposited in the form of powder, or, as it is usually called, amorphous sediment, or in the form of crystals and large concretions.

The amorphous sediment varies extremely in its colour, from snow-white to fawn-colour or reddish-brown, occasionally assuming a series of beautiful tints, varying from the most delicate pink to the brightest carmine, or very nearly to the deepest crimson. These varieties of colour depend on the greater or less proportion of the colouring-matter of urine, and a peculiar principle (phosphate of ammonia) developed in the kidneys. In this form the uric acid is usually in combination with ammonia. Healthy urine contains urate of ammonia to the amount of about 1·800th part, and the salt requires about 480 times its weight of cold water to dissolve it: we see therefore that if, by any derangement in the digestive organs, the quantity of urate of ammonia should be increased in the urine, a portion of it would of necessity be thrown down, as the urine would not be sufficient to hold the whole of it in solution. Urine containing this amorphous deposit varies in colour according to its sediment: it is always acid, and usually of high specific gravity, and is rendered transparent by the application of heat, unless the urine be albuminous or contain mucus.

We are indebted to Dr. Golding Bird for the following account of the microscopical appearances of urinary deposits:—When a deposit of urate of ammonia is examined under the microscope, it is found to be made up of a series of amorphous granules, presenting no approach to a crystalline arrangement, unless, as very frequently occurs, free uric acid be present. On gently warming the drop of urine submitted to examination, the deposit vanishes, and then any crystals of uric acid. Dr. G. Bird has informed the writer of this article that, since the publication of his previous investigations, he (Dr. B.) has detected deposits of urate of ammonia occurring in albuminous urine, in the shape of nearly spherical globules.

Uric acid is often deposited in a crystalline form, and is found most generally of a yellow, orange-red, or brick-dust colour, never however presenting the beautiful carmine tints occasionally possessed by urate of ammonia. It is sometimes met with isolated and unmixed with any amorphous deposits, but more generally is found in company with the urate of ammonia: on being allowed to subside, two distinct layers are formed, the lowest consisting of uric acid, often in crystals sufficiently large to be distinguished by the unassisted eye; and above this a dense stratum of amorphous urate. Dr. G. Bird has described several varieties of these crystals, as seen with the microscope, but the rhomboid of a tolerably distinct lozenge-shape is the most frequent form. Several secondary forms, probably depending on a variable portion of colouring-matter being present, frequently occur; among these are the table, the flattened cylinder, sharply serrated lozenges, and stella formed by the cohering of elongated rhombs.



Uric Acid Crystals.

Free Lactic Acid, Lactate of Ammonia, and Animal Matters not separable from them.—Berzelius regards the lactic acid as the free acid of the urine, and that it is destined to hold the earthy phosphates in solution, and probably to obviate the dire effects of their deposition in a solid mass. Dr. Prout says, that in the greater number of instances of uric acid gravel, the lactic acid is secreted in great abundance, either alone, which is comparatively rare, or in a state of combination with urea, which ordinarily occurs. As urea has little or no neutralizing power, the lactic acid in the lactate of urea exerts its acid powers, and, by detracting the uric acid from its natural state of combination with ammonia, precipitates it in the form of crystallized gravel.

Mucus always exists in healthy urine in minute quantities, and the following are the appearances which it assumes:—After the urine has stood for some time in a tall glass vessel, the lower strata of the fluid will be found to have lost their transparency, and an exceedingly light nebulous-looking substance will be found floating in the vessel. If collected in a filter, mucus, when moist, is always more or less transparent; and when dried, it has a shining appearance. Mucus is not coagulated by boiling, which distinguishes it from albumen; it is in great part soluble in the acetic and nitric acids, but not in the sulphuric acid; it is also soluble in caustic potass. In certain states of disease the character and quantity of mucus vary: sometimes the quantity is small, at other times it is considerable, and cases are recorded in which several pounds were passed during the twenty-four hours. Small quantities of the mucus thus coming away, render the urine muddy, pale, and flaky, and afterwards settle to the bottom of the vessel. The mucus however is sometimes like panada, and, being shaken, colours the urine without flakes; at other times it is stringy, flaky, and of a lumpy consistence. It has been seen so glutinous, as, on pouring it out of one vessel into another, to be drawn out above a foot in length, without rending. Sometimes it is transparent, white, yellow, green, with streaks of blue, often without smell; sometimes, on the contrary, it is dreadfully fetid.

Sulphur; Sulphuric Acid; Sulphates.—No fact is better established than the existence of sulphur in the blood, nor is its existence less certain in urine. There is however this remarkable difference between the two: in the blood very little is in the state of sulphuric acid; while in the fluid derived from that same blood and passed by the kidneys, the greater part of the sulphur is found to be oxidated to its maximum—that is, converted into sulphuric acid—and neutralized. The question then arises, whence is the requisite oxygen supplied?

During the circulation of the blood through the lungs, one of the changes there effected is the conversion of part of its carbon into carbonic acid, which is expelled with the breath. In that case, the necessary oxygen being derived from the atmosphere in respiration, and not by the skin, it might be asked whether, at the same time, there may not be a surplus of oxygen gas taken up and retained in the blood for appropriation in the glands, and particularly in the kidneys? The experiments of Allen and Pepys (*Phil. Trans.*, 1807-8-9) ascertained a fact which decides the question. They proved that the oxygen received by the lungs is all again expired, including that portion of it which is formed into gaseous carbonic acid. The oxygen, therefore, for the acidification of sulphur within the kidneys, must be derived from the blood itself; and if we may hazard a conjecture, probably from substances contained in it, but of no further use in the animal economy. But the decomposition of these substances, by the abstraction of part of their elementary oxygen, must convert them also into new compounds. In this way, possibly, that highly azotized body, urea, may be formed; for it seems improbable, in a healthy condition of the glands, that a substance of excrementitious character should be created immediately from the albuminous portion of the blood, unless in cases where albumen is formed in excess.

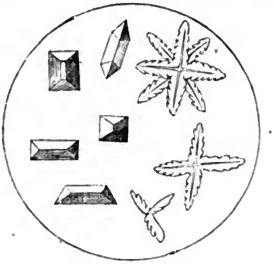
It has been a controverted question, whether urine contains sulphur in any other state than that of sulphuric acid. Berzelius was the first to show that it does, because after acidulation with muriatic acid, and precipitation with chloride of barium in very slight excess, and then decanting the clear supernatant liquid, there still remains in perfect solution some combination of sulphur; which may be detected by evaporting to dryness along with nitrate of barytes, and incinerating the residuum. In that residuum sulphate of barytes was discovered by Berzelius.

Phosphorus; Phosphoric Acid; Phosphates.—This element of the urine—unlike sulphur—exists only in the state of acid, that is, oxidated to its maximum: at least, it has not been found in any other state in healthy urine. The acid is but partly neutralized by the bases present.

The connection of phosphorus with the animal economy is interesting, because it forms an essential constituent of the earthy part of bone, fully four-fifths of which consist of basic phosphate of lime. It is the phosphate of lime, too, which, becoming deposited within the bladder, forms one species of urinary calculi. There is another urinary calculus in which the phosphoric acid is combined with magnesia and ammonia, usually called the triple phosphate; and sometimes both these phosphates are present in the same stone, constituting a third species, denominated the usible calculus. The formation of these particular deposits is attributed to a deficiency of free acid in the urine.

Urine containing an excess of phosphates is almost lways pale, often presenting scarcely more colour than mere water: when the contrary occurs, and the urine preents a near approach to the usual amber tint, it generally happens that the presence of an excess of earthy salt is but temporary. Whenever a deposit of phosphate of lime xists, the urine is generally alkaline, rarely neutral, although often slightly acid at the moment of emission. Urine containing phosphate of lime in a state precipitable by heat is always more or less acid.

Ammonio-Magnesian Phosphate.—The urine is sometimes neutral, often acid, and never alkaline, unless the deposited phosphate is really a secondary result. On exposing to heat urine of this kind, the triple salt is deposited, he precipitation often being attended with an evident volution of carbonic acid. Dr. Bird has figured two disinct forms of triple phosphate, each containing a different proportion of ammonia, and readily distinguishable by the shape of their crystals. The first appears under the microscope of a weak magnifying-power as a series of beautifully-defined transparent crystals, being either prisms or ome modifications of them. The second forms elegant tellar crystals, or thin crystalline laminæ, resembling oliage.



Triple Phosphate Crystals.

Where this salt exists in combination with phosphate of lime, forming the well-known fusible compound, the chaacters of the urine scarcely differ from those met with in imply phosphatic secretion.

Chlorine.—Chlorine, as such, is never developed in animal bodies. Where it exists in them it is usually in combination with sodium, forming common salt; but sometimes also in minute quantity with potassium, forming he chloride of that metal. It also exists in union with hydrogen and ammonia, forming common sal-ammoniac. All these neutral combinations are held dissolved in the urine, and never constitute morbid deposits; because neither with lime, with magnesia, nor with any other elementary substance present there, does chlorine form an nsoluble precipitate. If however free hydrochloric acid, of which chlorine is an elementary part, be habitually evolved within the stomach, as in dyspepsia, one of the consequences may be the formation of calculi or gravel, by the precipitation of the uric acid which the urine should retain in solution.

Soda; Potash; Ammonia.—The two fixed alkalies exist in the urine in combination with the sulphuric, phosphoric, muriatic, and lactic acids; whilst ammonia is found in combination only with the hydrochloric, phosphoric, and uric acids.

Lime.—If to urine, deprived by filtration of its vesical mucus, an excess of caustic ammonia be added, a very bulky precipitate is thrown down. This precipitate (besides a minute quantity of ammonio-phosphate of magnesia) contains the lime in union with phosphoric acid. The supernatant fluid, if evaporated to dryness and incinerated, will be found to yield no more lime: whence it is obvious that if, according to Berzelius's experiment, calcium exists in blood in some other state than lime, this metallic base must become oxidated during its excretion by the kidney.

Magnesia, like lime, in combination with phosphoric acid, is one of the constituents of bone earth; but it forms a very small part. It is also a principal ingredient of certain urinary calculi, into two species of which it enters. These are the 'triple phosphates,' or ammonio-phosphate of magnesia; and the fusible calculus, consisting of that salt and the phosphate of lime.

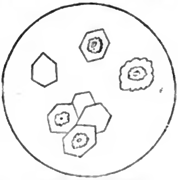
Silica, or Silic Acid, is reckoned by Berzelius amongst the constituents of healthy urine, and it has been occasionally detected in urinary calculi. It is most likely that the silica which exists in the urine finds its way into the system in the water or food, which is consumed, and escapes through the medium of the kidney. It is scarcely necessary to observe that siliceous deposits are of very rare occurrence.

Albumen is not characterised by any particular physical appearance: it often is of a natural colour, sometimes a little paler, at other times it is obviously tinged with blood. For the most part albuminous urine is transparent at the instant it is voided, but on cooling it becomes turbid: its odour is ordinarily less urinous than the urine of health. The tests for detecting albumen are various. Nitric acid is one of the best; for if a few drops be added to the urine containing albumen, a precipitate is formed, which we cannot re-dissolve by an excess of the acid, but which is readily dissolved by the addition of a sufficient quantity of alkali. Heat, from its property of quickly coagulating albumen, is an excellent test for recognising this principle, as it has the advantage of not coagulating the other elements of urine. Albuminous urine, on being exposed to a temperature of about 150°, becomes opaque, and deposits the principle in a coagulated state. The precipitate varies considerably in appearance in different instances, being sometimes firm, and similar to that formed by the serum of the blood, from which it may then be supposed to be derived; while at other times it is delicate, fragile, and somewhat resembling curd, when it may be supposed to be of chylous origin.

Xanthic (Uric) Oxide was first described by Dr. Marcet, and subsequently by Professor Stromeyer. It is said by Liebig to differ from uric acid by containing one proportion less of oxygen. The characters of urine containing this substance are not known, as the urine of the persons from whom the xanthic oxide calculi hitherto met with were taken was not analysed.

Cystic Oxide does not exist in healthy urine, but is occasionally found in certain states of disease. It contains a considerable proportion of sulphur, no less than two atoms being present in each equivalent of the oxide. This substance, when present in the urine, is always in a white crystalline state, never being found amorphous. When urine which contains a deposit of this kind is mixed with hydrochloric acid, it is not rendered clear: on the application of heat however the cystine slowly dissolves.

Dr. Bird says that when a deposit suspected to contain cystine is examined, it should be washed with boiling-water to remove the urates and any crystals of common salts which might be present, and then placed in a drop of water on a slip of glass under the microscope. Crystals of cystic oxide will then be readily distinguished, by their presenting one or other of two forms under which it occurs. In the first of these it appears under the form of tolerably regular six-sided tables, sometimes transparent throughout, but more generally opaque in the centre: in the second it occurs as roundish tables, opaque in the centre, and often quite so, somewhat crenate at the edges.



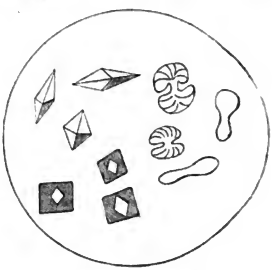
Cystic Oxide Crystals.

Cystic oxide may be distinguished by its solubility in alkalines and most acids, and by the characteristic odour it yields when burnt. It is however very little soluble in acetic acid: hence when cystic oxide exists in the urine, it may be readily precipitated from that fluid by vinegar.

Sugar does not exist in healthy urine, but in certain states of disease it is found in large quantities. Sugar of diabetic urine differs in appearance from common sugar, and approaches in its properties to the sugar of grapes, with which it is identical in composition. Urine containing sugar is generally pale-coloured, of specific gravity above 1·030, and its natural ingredients are often relatively much diminished in quantity.

A ready mode of ascertaining the presence of saccharine matter in diabetic urine is to add to it some yeast, which gives rise to vinous fermentation, a most delicate test, as it can detect one part of sugar in a thousand parts of urine. Every cubic inch of gas given off nearly corresponds in round numbers with one grain of sugar: 47 of gas to 45 of sugar.

Oxalic Acid; Oxalate of Lime.—Oxalic acid is never found in healthy urine, although, according to the important investigations of Dr. Golding Bird, deposits of oxalate of lime are of common occurrence. Where the acid does not result from the peculiar character of the ingesta containing it, as rhubarb or sorrel, the occasion of this morbid deposit is the formation of oxalic acid in the living body, possibly from some undue oxidation of carbon within the kidney. So strong is the affinity between lime and oxalic acid, and so great the insolubility of the resulting compound, that the addition of a very minute quantity of oxalic acid occasions in the urine a precipitate of oxalate of lime, because the oxalate, unlike the phosphate of this earth, is not at all soluble in the natural acid of the secreted fluid. Dr. G. Bird says that when deposits of oxalate of lime exist, the urine is acid, in tint varying from a pale straw-colour to deep amber, sometimes nearly limpid, much more generally containing a copious deposit of urate of ammonia of a very pale colour, rarely being tinged with pink; and frequently mixed with uric acid and numerous fragments of epithelium: the specific gravity generally exceeds the average density of healthy urine, but sometimes is below it, varying from 1·016 to 1·029. An excess of urea is frequently present, so that when the urine is above the density of 1·020 it crystallizes very quickly after the addition of an equal bulk of nitric acid. When the urine contains no urate of ammonia, the deposit of oxalate of lime, on account of its transparency, is generally nearly imperceptible; but on decanting the supernatant fluid, after a few hours' repose, and placing a few drops of the lowermost layers in a capsule, a white crystalline sediment is very readily distinguishable; and this when examined under the microscope presents a very beautiful appearance. The crystals are invariably sharply defined and always entire, in figure perfectly octahedral, differing however materially in the acuteness of the terminable angles: if these are very acute, the crystals are seen lying on their sides with their angles and edges exceedingly distinct.



Oxalate of Lime Crystals.

Carbonic Acid: Carbonate of Lime.—Carbonic acid was long ago supposed to exist in urine, although its existence in this fluid is doubted by Berzelius. Dr. Prout says that he has frequently met with this acid in urine, and is most frequently derived from the decomposition of urea which with water is readily converted into carbonate of ammonia. Carbonate of lime is occasionally found in the urine, and is probably formed by the reaction of carbonate of ammonia on the phosphatic salts: the urine in these cases is alkaline. Carbonate of lime dissolves with effervescence in dilute acid.

Pus is often found in great abundance in the urine. Upon standing, the pus subsides to the bottom of the vessel, in a state more or less pulverulent, and the fluid resumes its transparent character. If pus be present as well as mucus the former is found lying on the latter, and presents a much yellower tint; it is also quite opaque, whereas mucus is more or less transparent. A ready test for determining whether the deposit from the urine be of a purulent nature is to add liquor potassæ to the sediment collected in a phial or test tube. If it be purulent, it will, on agitation, form with the alkali a transparent viscid compound.

CAUSES.				TREATMENT.
1. Errors in Diet. 2. Fatigue. 3. Dyspepsia. 4. Arthritis. 5. Dentition.	I. The Lithic—	I. Diathesis.	Urine Acid, from the Superlithate of Ammonia.	1. Wholesome Diet. 2. Mild Aperients, especially Rochelle Salt. 3. Mild Mercurials. 4. The Alkalis. 5. Magnesia. 6. The Gum Lancet.
		II. Amorphous Deposits.	I. Lithate of Ammonia, frequently mixed with the II. Lithates of Soda and Lime.	
		III. Crystals or Gravel.	Lithic Acid, nearly pure.	
		IV. Concretions or Calculi.*	I. The Lithic Acid. II. The Lithate of Ammonia.	
	tend to			
	An intermediate station is to be allotted to the Oxalate of Lime—	I. Diathesis. II. Amorphous Deposit. III. Crystals or Gravel. IV. Calculus.	Urine nearly natural. The Mulberry, or Hempseed.	1. Antiphlogistics. 2. Mild Aperients, not the Rochelle Salt. 3. Mild, wholesome Diet. 4. The muriatic Acid.
	pass into			
1. Irritability } of the System. 2. Debility } 3. Sickly Childhood. 4. 'Breaking-up' of the System. 5. Injuries of the Spine.	II. The Phosphatic—	I. Diathesis.	Urine Alkaline and abounding in the Phosphates.	1. Strict Regimen. 2. Mild Aperients—as Rhubarb. 3. Opium; Hyoscyamus, &c. 4. The Uva Ursi; the Alchemilla arvensis, &c. 5. Rhenish or French Wines, Cider, Perry, Lemonade, &c.
		II. Amorphous Deposits.	I. Triple Phosphate (of Magnesia and Ammonia), mixed with II. Phosphate of Lime.	
		III. Crystals or Gravel.	Triple Phosphate.	
		IV. Concretions or Calculi.*	I. The *Triple* Phosphate. II. The *Mixed* { 1. Triple Phosphate with 2. Phosphate of Lime; } or the Fusible Calculus.	*Avoiding.* 1. Alkalis. 2. Salts with a vegetable Acid, as Rochelle Salt. 3. Mercury.

* To these must be added— I. The *Alternating*; generally consisting of { A Lithic Acid, or Mulberry *Nucleus*; An *External Crust* of the *Mixed* Phosphates. II. The *Mixed*; generally consisting of { The Lithate of Ammonia; The Phosphates.

* A special place is to be allotted to { The Prostatic Calculi. { These consist of Phosphate of Lime alone.

Lastly—The Cystic Oxide; the Xanthic Oxide; the Carbonate of Lime; the Fibrine Calculi, are all extremely rare.

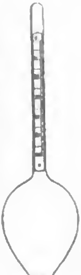
Principles *dissolved* in the Urine.	Urea in excess.	Diabetes insipidus;	Urine of high Specific Gravity; as 1·025	Blood letting. Mild Animal Diet.
	Sugar.	Diabetes.	Urine profuse; sp. gr. *very* high; as 1·050. Saccharine.	Opium. Dover's Powder. Warm Baths. Carbonate of Iron.
	Albumen.	Frequently Disease of the Kidney.	Urine coagulates by heat.	

Principles *mixed* with the Urine.	Mucus.	Scanty when from the Kidney. Profuse when from the Bladder.
	Pus. Blood.	From Calculus, or Disease, of the Kidney or Bladder.

Blood is often poured out in abundance from the mucous membrane lining the urinary passages, and is generally diffused through the urine, or is passed entire. In other cases small quantities of blood are passed, mixed with pus or mucus, or alone, after the urine has been voided. When large quantities of blood are passed, especially without pain, it is probably a simple exudation from some part of the mucous surface of the urinary organs; on the other hand, when the blood is mixed with pus or mucus, and passed with pain, it denotes ulceration of the kidney or bladder, and may be combined with the existence of a foreign body in the bladder. Dr. Willis, and other writers, quote several authorities to show that hæmaturia is endemic in some countries. M. Chapotain, for instance, informs us that in the Isle of France children from their infancy are liable to hæmaturia without suffering any pain from it, or its appearing to prejudice their general health. M. Salesse, a native of the Isle of France, and now a practitioner of medicine there, states that three-fourths of the children are affected with hæmaturia at one time or another. In these cases the bloody urine is generally observed to alternate with that which is chylous or oleo-albuminous. During the invasion of Upper Egypt by the French, many of the men suffered from an epidemic hæmaturia.

The preceding table, constructed by Dr. Marshall Hall, gives a good synoptical view of the diseases of the urine, their causes, and the most appropriate remedies.

(*Traité des Maladies des Reins*, par P. Rayer, tome premier. Paris, 1839; *On the Nature and Treatment of Stomach and Urinary Diseases*, by William Prout, M.D., third edition, London, 1840; 'Observations on Urinary Concretions and Deposits,' by Golding Bird, A.M., M.D., in the 7th vol. of *Guy's Hospital Reports*: *On Diseases of the Bladder and Prostate Gland*, by William Coulson, third edition, London, 1842; *Observations* by John T. Barry *On Sulphur, Phosphorus, &c.*, in the same work; *On the Chemical Discrimination of Vesical Calculi*, by E. A. Scharling, A.A., LL.H., translated by S. Elliott Hoskins, M.D., from which work the synopsis of the diseases of the urine is taken.)



URINO'METER, an instrument for ascertaining the weight of urine. It is constructed on the principle of a common hydrometer, and consists of a glass-tube, which at its lower extremity has two bulbs, the lower one very small, containing a heavy substance, such as mercury, and the other immediately above it much larger, and filled with air. The tubular portion contains a scale denoting with certain figures the specific gravity, the use of which will be illustrated by the following example:—Suppose the water's edge cut the scale at figure 25, then add that number to 1000, and the specific gravity will be 1·025.

URIYAN LANGUAGE. [HINDUSTAN, xii. 227.]

URKHAN. [TURKEY, xxv. 396.]

URMIAH, LAKE. [AZERBIJAN; PERSIA.]

URN. [VASES.]

UROMASTIX. [STELLIO.]

URSA MAJOR and URSA MINOR (the Greater and Lesser Bear), two of the most remarkable constellations of the northern hemisphere: the latter as containing the pole star, or the visible star which is nearest to the northern pole of the heavens; the former from its well known seven stars, by two of which the pole star is always readily found. These seven stars, which are α, β, γ, δ, ε, ζ, and η of the constellation Ursa Major, are disposed in the form of a quadrangle joined by one of its corners to a triangle, and with this description it would be difficult to avoid finding them out. A line drawn from β to α, the two pointers, as they are called, passes through the Pole star when continued: these two pointers being the stars of the quadrangle which are farthest from the triangle. This Pole star (α Ursæ Minoris) is the principal star in Ursa Minor, which has seven stars placed together in a manner very much resembling Ursa Major, the Pole star being the corner of the triangle which is farthest from the quadrangle.

The common people of most countries call the seven stars of the Great Bear by the name of 'the waggon,' sometimes by that of 'the plough.' Aratus most distinctly says that both the bears were called waggons by the Greeks:

δύω δέ μιν ἀμφὶς ἔχουσαι
Ἄρκτοι ἅμα τροχόωσι, τὸ δὴ καλεῦνται ἅμαξαι;

and 'Charles's Wain' is familiar to all our readers. The later stories of Grecian mythology are hardly worth recording: the nymph Calisto was transformed by Diana into the Great Bear for an amour with Jupiter; while the Lesser Bear is Cynosura [CYNOSURE], one of the nymphs who nursed Jupiter.

The following are the principal stars in these constellations:

Ursa Major.

Character. Not in Bayer ().	No. in Catalogue of		Magnitude.	Character. Not in Bayer ().	No. in Catalogue of		Magnitude.
	Flamsteed. Piazzi ().	Astron. Society.			Flamsteed. Piazzi ().	Astron. Society.	
ο	1	1020	4½	α	50	1305	1½
π	4	1042	5	ψ	52	1315	3½
ι	9	1092	4	ξ	53	1329	4
e	18	1118	5	ν	54	1330	4
h	23	1146	4	(n)	55	1331	5
d	24	1148	4½	χ	63	1370	4
θ	25	1152	3½	γ	64	1379	2
υ	29	1179	4	δ	69	1407	2½
φ	30	1181	5	ε	77	1489	3
λ	33	1219	3½	ζ	79	1534	3
μ	34	1230	3	g	80	1537	5
	36	1244	5	η	85	1575	3
(m)	37	1255	5		126	1266	5
ω	45	1291	4½	κ	230	1099	4½
β	48	1301	2				

Ursa Minor.

Character. Not in Bayer ().	No. in Catalogue of		Magnitude.
	Flamsteed. Piazzi ().	Astron. Society.	
α	1	115	3
(A)	5	1652	4
β	7	1700	3
γ	13	1734	3
θ	15	1792	5
ζ	16	1824	4
η	21	1895	5
ε	22	1964	4
δ	23	2148	3
	(111)	1359	6

URSERENTHAL. [URI.]

U'RSIDÆ. The genus *Ursus* is placed, in the last edition of the *Systema Naturæ* that underwent the revision of Linnæus, between *Mustela* and *Didelphis*, and includes the following species—*Arctos*, *meles*, *lotor*, and *luscus*: in other words, it consists of the true Bears, the Badger, the Raccoon, and the Wolverene or Glutton.

The genera which form Cuvier's PLANTIGRADA will be found under that article.

Mr. Swainson makes the *Bears* a subfamily, *Ursinæ*, of his family *Mustelidæ*, placing them immediately after the *Mustelinæ*. Mr. Swainson's *Ursinæ* are thus defined:—

Walk plantigrade; grinders more or less tuberculated: stature generally large; carnivorous and frugivorous; claws formed for digging; tail generally short.

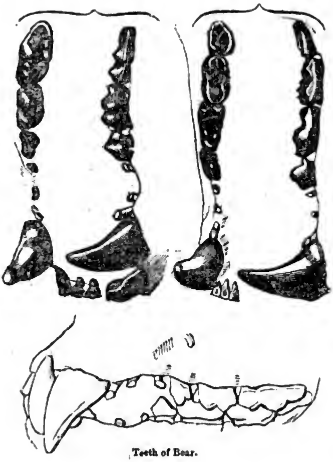
Genera: *Meles*, Briss.; *Ursus*, Linn. (with the subgenera *Prochilus*, Ill. and *Helarctos*, Horsf.); *Prochyon* (Procyon), Storr; and *Nasua*, Storr.

ORGANIZATION.

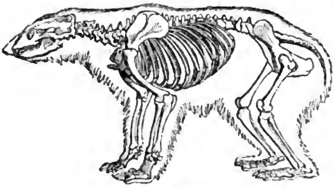
Ursus. (Linn.)

The cylindrical bones of bears come nearer to those of man than the same bones in any other quadruped: the femur especially, although there is but a slight depression for the ligamentum teres, is closely approximated to the same bone in the human skeleton; and hence the faculty possessed by the bear of rearing itself on its hind-legs and dancing. The caudal vertebræ in every well-preserved skeleton—those in the Museum of the College of Surgeons, for instance—extend beyond the pelvis.

Dental Formula:—incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{6-6}{7-7} = 42$.



Teeth of Bear.



Skeleton of Polar Bear.

Digestive Organs.—The digestive organs of the *Ursidæ* correspond, as might be expected, with their dentition, which is indicative of their omnivorous nature, modified however, according as the vegetable or animal diet prevails in each species. In the Museum of the Royal College of Surgeons, Nos. 698 and 699 (*Physiological Series*) are longitudinal sections of the small intestine, injected, of *Ursus arctos*, in which the mucous membrane, as in the lion, is not produced into *valvulæ conniventes*, but the villi are longer and coarser, and of a flattened instead of a cylindrical form. No. 700 is a smaller section from a lower part of the intestinal canal of the same bear, showing that the villi have here disappeared, and that the mucous coat is raised into slight transverse rugæ: some small patches of glands may be also noticed in this part of the intestine. No. 781 exhibits the duodenum and pancreatic duct of the same species. No. 543 D. is the pyloric end of the stomach of the labiated bear, *Ursus labiatus*, with the muscular fibres proportionably augmented at that end. The pylorus is shut up towards the stomach by a valvular protuberance, as in the manis and armadillo, like which animals *Ursus labiatus* is, in its natural state, insectivorous. No. 760 B. is a portion of the ileum injected of this last-named species, shewing a long narrow patch of aggregated glandulæ.

Brain, Nervous System, and Senses.—The brain is fairly developed, and the senses, generally, are acute: but there is nothing that would justify our occupation of space by a particular description. We would refer however to the two preparations 1515 A. and 1515 B., in the College Museum, the former being the os hyoides of a Polar bear, and the latter the dilated extremity of the tongue of the same species. The upper surface of the tongue is characterised by a mesial longitudinal groove, and by the close-set, small, equal-sized papillæ: the papillæ on the sides of the under surface are coarser.

Circulating and Respiratory Systems.—Nothing requiring particular notice.

Urinary and Generative Systems.—The kidney of the bear is divided into distinct lobes or renules. No. 1259 in the series above quoted is one injected which belonged to *Ursus arctos*. The lobes or renules are separated from each other by the removal of the delicate capsule and intervening cellular tissue, and they are then seen to be suspended from the trunks of the vessels and excretory duct like a bunch of grapes. No. 1260 is one of the lobes or renules of the same kidney, divided to show the cortical and medullary substances, the mammilla, and infundibular process of the ureter, the whole representing a kidney of simple structure. No. 1260 A. is the injected kidney of *Ursus labiatus*. The renules are separated to show the principal branches of the ureter, and some of them are laid open to show the two mammillæ and corresponding cones of tubuli which they contain. No. 1261 is the kidney of *Ursus Americanus*, with the capsule and connecting cellular substance removed on one side, but left on the other. No. 1262 is the kidney of the polar bear with the capsule removed and the renules partially separated. No. 1263 is one of the lobes of the kidney, and the supra-renal gland of *Ursus arctos*.

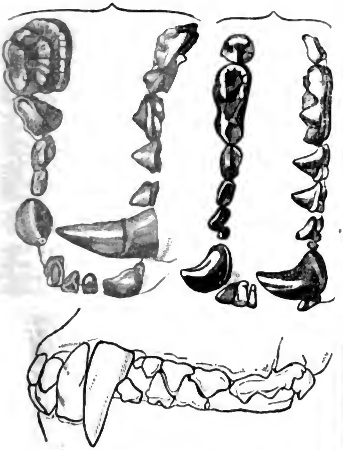
The bears have no vesiculæ seminales; they have a bone in the penis. No. 2515 of the series above quoted shows the neck of the bladder and commencement of the urethra and vasa deferentia of *Ursus arctos*. The vasa deferentia are injected with mercury to show the cellular or follicular structure of their terminal dilatations, which, though in contact, are quite distinct from each other, both as to their cavities and proper substance: the continuation of the vas deferens beyond the dilated part is at first wide, but contracts as it converges towards its fellow to terminate on the verumontanum.

No. 2805 exhibits the female organs of a Polar bear. The ovaria are completely enclosed in a reflected capsule of the peritoneal membrane, like the testes in their tunica vaginalis: a small opening however leads into the ovarian capsule at the part next the horn of the uterus. The fimbriated orifices of the Fallopian tubes are situated close to this aperture: the tubes pass round the capsule in a tortuous course to the uterus. The two cornua uteri communicate with a short and wide corpus uteri, between which and the vagina there appears, in the preparation, to be no very distinct boundary; a broad, transverse, rugous projection of the lining membrane holds the place of the os tincæ. The vagina is separated from the urethro-sexual canal by two transverse semilunar folds continued, one from each side of the longitudinal eminence upon which the urethra opens. The lining membrane of the urethro-sexual canal is chiefly remarkable for its dark colour and sharply-defined rugæ, which are mostly longitudinal, but in some places have an oblique or penniform arrangement. The clitoris lies concealed in a deep preputial cavity, attached throughout its whole length to the anterior or under part of the urethro-sexual canal. Bristles are inserted into the right horn of the uterus and into the urethra. No. 2805 presents the female organs of *Ursus labiatus*. The ovarian capsules are artificially distended, and that on the left side is laid open to show its large size as compared with the ovarium. This organ is bisected, showing the different colours of its central and superficial stroma, and the small ovisacs imbedded in the latter. The left horn of the uterus has the whole of its cavity exposed, showing the obtuse, depressed, irregular processes of its lining membrane. The body of the uterus offers a very contracted area: it terminates by a small, circular, papillose ridge, in a short but wider canal, which traverses a similar but much larger prominence or os tincæ; these valvular projections are longitudinally bisected in the preparation: their surface is minutely plicated. The lining membrane of the vagina presents many small, irregular, transverse rugæ at its commencement, but these gradually pass into the longitudinal direction at ts termination in the urethro-sexual canal, which is by a arge, corrugated, valvular fold. Immediately beyond this fold is the opening of the urethra, situated between two thick, longitudinal rugous ridges. The greater part of the urethro-sexual canal has a smooth internal surface.

The natural history of the various species of **Bears** will be found under that title.

Meles. (Briss.)

Dental formula:—incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{4-4}{6-6} = 36$.



Teeth of Badger.

For the natural history of this genus, see the article **Badger.**

Gulo. (Retz.)

For the dental formula and natural history of the genus, see **Gulo.**

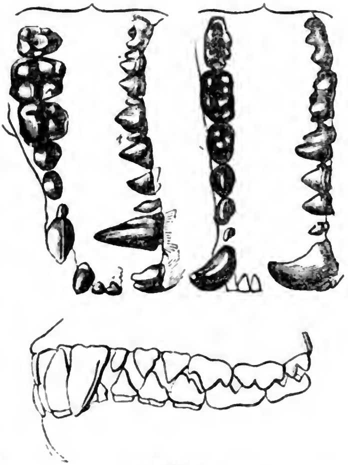
Procyon. (Storr.)

Generic Character.—Three last molars with blunt tubercles on their crowns. Muzzle pointed. Ears small. Tail very long and hairy. No anal follicules. Six ventral mammæ. Feet pentadactyle: claws sharp; the entire sole of the foot applied to the ground, when the animal is stationary only; in progression the heel is raised.

Dental formula:—incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{6-6}{6-6} = 40$.

Example, *Procyon lotor* (*Ursus lotor*, Linn.).

No. 735 of the series above quoted shows the anus, with the anal glands of a Raccoon. The excretory orifices of the glands open on each side, within the verge of the anus. They are surrounded by a strong capsule of muscular fibres, necessary for the expulsion of the unctuous secretion; these fibres have been removed from one of the glands. No. 1222 is the kidney of a Raccoon minutely injected by the arteries, showing its simple conglobate form, as contradistinguished from the same organ in the Bear. The vascularity of the cortical substance, and the form of the mammilla, in which the medullary part terminates, are also well displayed in this preparation. No. 1824 is the great omentum of the same animal, showing the reticulate deposition of the adipose substance in that part. No. 1954 shows the two kinds of hair with which this animal is furnished. No. 2515 C. shows the glans and os penis of a Raccoon. The distal end of the ossicle is an expanded subcircular, convex, imperforate disc, which is simply covered with the skin of the glans, of which it forms the most prominent part: the erectile tissue of the glans and the urethral orifice are below the terminal disc.



Teeth of Raccoon.

There is also a small bone in the clitoris of the female.

Description.—Head round, with a narrow tapering nose projecting beyond the mouth, black at the end, and flexible: the lips black. Eyes moderately large and round, with a circular pupil. Elliptical ears, low, but erect with rounded tips, dirty white. Whiskers strong. Short-haired muzzle, dirty white, the colour extending round the cheek and over the eyes. A dark brown mark across the eyes and cheek, and another between the eyes, extending from the forehead. Back grizzled. Belly paler than the back. Tail bushy, not unlike a fox's brush, dirty white, annulated with dark rings. Length of head and body, 2 feet; of tail (vertebræ), 9½ inches.

This is the *Raton* of the French; *Raccoon* ('*Coon* in clipped language) of the Anglo-Americans; *Mapach*, *Yllamaton*, *Maxtle*, and *Cioatlamacazque** of the Mexicans; and *Raccoon Bear* of Pennant.

Geographical Distribution.—'This animal,' says Dr. Richardson, 'inhabits the southern parts of the fur districts, being found as far north as Red River, in lat. 50°, from which quarter about one hundred skins are procured annually by the Hudson's Bay Company. If there is no mistake as to the identity of the species, the Raccoon extends farther north on the shores of the Pacific than it does on the eastern side of the Rocky Mountains. Dixon and Portlock obtained cloaks of Raccoon skins from the natives of Cook's River, in lat. 60°, and skins supposed to be of the Raccoon were also seen at Nootka Sound by Captain Cook. Lewis and Clarke expressly state that the Raccoon at the mouth of the Columbia is the same with the animal so common in the United States. Desmarest says that the Raccoon extends as far south as Paraguay.'

Habits, &c.—The negroes of Georgia, near Savannah, declare, at the present day, that at low tide the Raccoons go down to the shore, open and eat oysters, and that occasionally when they put their paw in to take out a large-sized oyster (those mollusks are often of great size in that locality), the oyster closes his shell, and holds the Raccoon in this living trap till the flowing tide drowns the four-footed burglar, unless the 'coon manages to bite off his paw and escape in time. The planters laugh scornfully at this Negro narrative, treating it as an idle and groundless tale. But zoologists well know that the information obtained from unlettered natives in newly discovered countries, and from those whose condition of life requires them to be much in the open air and abroad in more civilized places, is not to be despised, and, in the last-mentioned case, is generally far more valuable than their indolent and luxurious masters can impart. We think that we shall be able to bring forward evidence which will lead our readers to the conclusion that, with regard to this Raccoon story, the planter deserves to be laughed at more than the Negro.

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* Hernandez, i., c. 1.

We will begin with Lawson, who was surveyor-general of North Carolina, and who, in his 'History,' *containing the exact description and Natural History of that country, together with the present state thereof. And a Journal of a Thousand miles, Travelled through several Nations of Indians*, &c., (1714), thus writes:—

'The Raccoon is of a dark grey colour; if taken young is easily made tame, but is the drunkennest creature living, if he can get any liquor that is sweet and strong. They are rather more unlucky than a monkey. When wild they are very subtle in catching their prey. Those that live in the salt-water feed much on oysters, which they love. They watch the oyster when it opens, and nimbly put in their paw and pluck out the fish. *Sometimes the oyster shuts, and holds fast their paw till the tide comes in, that they are drowned, though they swim very well.* The way that this animal catches crabs, which he greatly admires, and which are plenty in Carolina, is worthy of remark. When he intends to make a prey of this fish, he goes to a marsh, where, standing on the land, he lets his tail hang in the water. This the crab takes for a bait, and fastens his claws therein, which, as soon as the Raccoon perceives, he of a sudden springs forward a considerable way on the land, and brings the crab along with him. As soon as the fish finds himself out of his element, he presently lets go his hold; and then the Raccoon encounters him, by getting him crosswise in his mouth, and devours him. There is a sort of small Land-Crab, which we call a *Fiddler*, that runs into a hole when anything pursues him. This crab the Raccoon takes by putting his fore-foot in the hole, and pulling him out. With a tame Raccoon this sport is very diverting. The chief of his other food is all sorts of wild fruits, green corn, and such as the bear delights in. This and the *Possum* are much of a bigness. The fur makes good hats and linings. The skin dressed makes fine women's shoes.'

Now Lawson's authority is very good. He was a sharp observer, and there is an air of truth about his book that places it above suspicion. Mr. Lyell, when lately in America, saw the prints of the Raccoon on the sands at Georgia, near Savannah, and traced them fresh to the beds of oysters exposed at low-tide. It is worthy of remark that the crabs called *Fiddlers* still abound in the same locality, and the turkeys are known to devour multitudes of them; nor is it too much to suppose that the Raccoons which haunt thereabout come in for their share. The *Procyon cancrivorus* of Geoffroy, *Raton Crabier* of Buffon, *Chien Crabier* of La Borde and the inhabitants of Cayenne, seeks on the shores the crabs from which it derives its name.

Pennant notices the Raccoon as 'an animal easily made tame; very good-natured and sportive, but as unlucky as a monkey; almost always in motion; very inquisitive, examining everything with its paws; makes use of them as hands; sits up to eat; is extremely fond of sweet things and strong liquors, and will get excessively drunk; has all the cunning of a fox; very destructive to poultry, but will eat all sorts of fruits, green corn, &c.; *at low-water feeds much on oysters; will watch their opening, and with its paw snatch out the fish; sometimes is caught in the shell, and kept there till drowned by the coming in of the tide:* fond also of crabs; climbs very nimbly up trees; hunted for its skin; the fur next to that of the Beaver, being excellent for making hats.'

Now let us turn to Catesby, who says of the Raccoons, 'they are numerous in Virginia and Carolina, and in all the northern parts of America, and are a great nuisance to corn fields and hen-roosts; their food is also berries and all other wild fruit. *Near the sea and large rivers, oysters and crabs are what they very much subsist on; they disable oysters when open, by thrusting in one of their paws, but are often catch'd by the sudden closing of it and held so fast (the oyster being immoveably fixed to a rock of others), that when the tide comes in they are drowned.* They lie all the day in hollow trees and dark shady swamps; at night they rove about the woods for prey. Their flesh is esteemed good meat, except when they eat fish.'

Dr. Richardson, speaking of the Raccoon, says, 'In the wild state it sleeps by day, comes from its retreat in the evening, and prowls in the night in search of roots, fruits, green corn, birds, and insects. It is said to eat merely the brain or suck the blood of such birds as it kills. *At low-water it frequents the sea-shore to feed on crabs and oysters.* It is fond of dipping its food into water before it eats, which occasioned Linnæus to give it the specific name of *lotor*. It climbs trees with facility.'

So much for the statements relative to the Raccoon in a state of nature. We have now to present the animal to the reader in a state of captivity, and here again we shall find confirmation of the habits ascribed to it when roaming free.

In Mr. Bennett's 'Tower Menagerie' we find a pretty vignette of two Raccoons, one of them intent upon a large spider, and the other *in the act of opening an oyster*. 'In captivity,' says Mr. Bennett, 'they are easily tamed, and even appear susceptible of some degree of attachment; but they never entirely lose their sentiment of independence, and are consequently incapable of complete domestication. When placed under a certain degree of restraint, they appear contented and happy, are fond of play, and take pleasure in the caresses of their friends and even of strangers; but however long this kind of domestication may have continued, and how much soever they may seem reconciled to their confinement, the moment the restraint is withdrawn and they feel themselves at liberty, the love of freedom prevails over every other consideration, and they become as wild as if they had never been reclaimed. In eating they commonly support themselves on their hind-legs, and carry their food to the mouth between the fore-paws, having first plunged it in water, if the liquid element, of which they are remarkably fond, is within reach. This singular peculiarity, the object of which is not very obvious, but from which the animal derives his specific name, does not however appear to be constant and uniform, being frequently entirely neglected. The same may be said of their fondness for shell-fish and mollusca, for which they are generally stated to have a great partiality, *some of these, like the handsome pair now living in the Menagerie, displaying the greatest address and dexterity in opening the shell of an oyster and extracting its contents*, while others absolutely refuse to touch it.' (1839.)

The Raccoon (E. T. Bennett.)

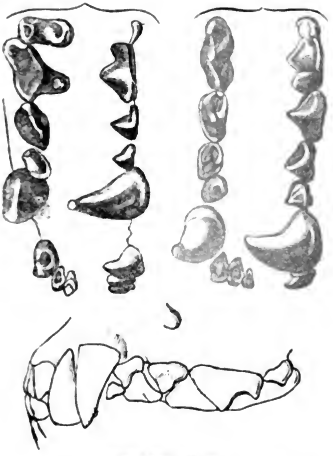
For the readiness with which the Raccoon takes to strangers, we can answer from personal observation. One, which had probably escaped from a menagerie, was caught in a preserve in Dorsetshire by one of the under-keepers. The animal became at once familiar with him, ran about his shoulders, put his paws in his pockets, and appeared as much at home as if he had been his companion for years.

Utility to Man.—The fur is used in the hat-manufacture, and the flesh, when it has been fed on vegetables, is said to be well-flavoured. In the 'Perfect Description of Virginia' (1649), among the beasts are enumerated '8 *Raconnes*, as good meate as Lambe.'

Mellivora. (Storr.)

General characters corresponding with those of Gulo.—Feet pentadactyle.

Dental formula:—incisors $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{4-4}{4-4} = 32$.



Teeth of Ratel. (F. Cuv.)

In some points this genus approximates the Hyænas: in others, the Polecats, Zorillas, and Martins.

No. 1414 of the 'Physiological Series' (*Mus. Coll. Chir.*) is the left fore-foot of the Ratel, showing the naked skin covering the soft cushions on the under surface of the toes. No 1610 is a portion of the integument of the same animal, including the external orifice of the meatus auditorius, which is here suddenly expanded, and the cavity provided with slightly elevated margins and some internal folds or risings; but there is no projecting external concha in this animal, which, as it burrows for temporary purposes, has the apparatus for collecting the rays of sound only so far developed as was compatible with subterraneous progression. No. 2804 shows the female organs in this species. The ovaria are completely inclosed in peritoneal capsules; a portion of the right capsule has been removed to expose the ovary, which presents a smooth and even exterior; a bristle is placed in the opening of the opposite capsule. The cavity of the left horn of the uterus is partly exposed, to show the thick, longitudinal, and oblique folds of the soft lining membrane. The os tincæ is formed by a double circular prominence; the internal surface at the commencement of the vagina is beset with numerous and minute oblique rugæ, which become larger and more longitudinal as they approach the urethro-sexual canal; the vagina opens into this canal by a bilobed fold or projection, resembling a second os tincæ; the urethra opens upon the anterior lobe or prominence of this fold. The inner surface of the urethro-sexual canal is very smooth. The left anal gland is laid open to show the smooth and glistening epithelium which lines its cavity.

Mellivora Capensis.

Description.—Hair rather smooth, but stiff and wiry. Body above from the top of the head to the root of the tail dull ash-grey, whitest towards the head. Muzzle, space round the eyes and ears, limbs, all the under parts, and rest of the tail black. Claws on the fore-feet long, the middle three longest, the internal claw placed much more backward than the rest. Bulk about that of a Badger. Total length three feet, the tail about a sixth of the length. Height about ten or twelve inches.

This appears to be the *Viverra Capensis* of Schreber, *Gulo Capensis* of Desmarest, *Mellivora Capensis* of F. Cuvier, *Viverra mellivora* and *Ursus mellivorus* of Blumenbach, *Taxus mellivorus* of Tiedemann, *Meles mellivora* of Thunberg, *Stinkbinksen* of Kolbe, ? *Ratel* of Sparrmann, *Fizzler Weesel* and *Ratel* of Pennant, *Honey Weesel* of Shaw, *Honig freter* of the Dutch Cape colonists, and *Blaireau Puant* of La Caille.

Mr. Bennett observes that this animal was first clearly described by La Caille in his 'Voyage to the Cape,' under the misapplied designation given above as the last synonym. This unmerited epithet, he remarks, has, in all probability, given rise to the general opinion that it is also the animal referred to by Kolbe as the Stinkbinksen of the Dutch Colonists; but there is scarcely any part of his account of that disgusting creature which fairly warrants the inference. It is far more likely, Mr. Bennett thinks, that his beast was the Zorille, to which alone, of all the animals of Southern Africa, its manners bear a close resemblance. Sparrmann described it with tolerable accuracy, under its Hottentot and Colonial designation, which it still retains. Gmelin and Shaw have subdivided these synonyms and formed two species, *Viverra Capensis* and *Viverra mellivora*. Pennant, who gives the designations of La Caille, Sparrmann, and Kolbe, under his title *Ratel*, saw John Hunter's living Indian specimen, treated it as distinct from the African animal, and called it the *Indian Badger*, out of which Shaw made his *Ursus Indicus*.

'The only visible difference,' says Mr. Bennett, 'which we have been able to detect between the Asiatic and African animals consists in this, that the latter is described as possessing a stripe of lighter gray, about an inch in breadth, passing from behind the ears along each side, and forming the boundary of the two colours, which is entirely wanting in our specimen, and in the figure of the Indian variety given by General Hardwicke.'

Geographical Distribution.—South Africa and India.

Habits, &c.—The hide of this quadruped is so tough and loose, that, according to Sparrman, if anybody catches hold of it by the back part of the neck, it is able to turn round, so to speak, in its skin and bite the offending arm. The claws of the fore-feet are longest and well formed for grubbing. The bees, according to the description of the author last quoted, who drew his information from the Hottentots, furnish the principal means of subsistence to the Ratel. These insects, in that part of South Africa where the Ratel is found, usually inhabit the deserted lairs and burrows of the Ethiopian Boar, the Porcupine, &c., and, according to the accounts given, the Ratel, which preys in the evening, ascends to the highest parts of the deserts to look out, and will then raise its paw before its eyes to prevent their being dazzled by the sun. Here he watches and listens for the *Honey-Guide Cuckoo* [Indicatorinæ], which serves both the Hottentot and quadruped as a conductor to the bees' store, or for the flight of the bees themselves. If the beast have luck to trace the guide or the insect it follows, and if the nest be on the ground or near it, undermines it with its natural digging instruments, and secures the contents. If the nest be in the tree, the Ratel, which cannot climb, gnaws the trunk in its unavailing rage, leaving marks which the Hottentot well knows as indicative of the treasure above.

Mr. Bennett well observes that the dentition of the Ratel is much at variance with the diet above attributed to him, and that the accuracy of these accounts may be doubted. 'It requires,' says he, 'the most positive evidence to convince us that an animal, the number and disposition of whose teeth correspond more closely with those of the cats than any other quadruped with which we are acquainted, and exhibit a carnivorous character scarcely, if at all, inferior to that which is evidenced by the same organs in the Hyænas, should subsist entirely, as from these accounts we are left to believe, upon the petty rapine of a hive of bees and the honied produce of their comb. Still there exist such decisive marks of a diminished capacity for preying on animal food in the thickset and clumsy form of its body, the shortness of its limbs, its partially plantigrade walk, the structure of its claws, the elongation of its muzzle, and even in the form of the teeth themselves, as to induce us to pause before we determine to reject the popular testimony as unworthy of credit, although we must regard it as doubtful on some particular points, and insufficient and imperfect on the whole.'

Of the habits of the Indian animal General Hardwicke gives a very different account. He notices it as found in several parts of India, on the high banks of the Ganges and the Jumna, whence it rarely comes forth by day, but prowls at night round the dwellings of the Mohammedan natives, and scratches up the newly-buried dead bodies, unless the graves are protected by a covering of thorny bushes. So quickly does it burrow, that it will work itself under cover in the hardest ground in ten minutes. The natives sometimes dig them out and take them alive; but the old ones are secured with difficulty and seldom live long in captivity. The young however are docile and playful. Their food is flesh in any state, but birds and living rats appear to be very acceptable. They are fond of climbing, but climb clumsily, although they will ramble securely along every arm of a branching tree, if it be sufficiently strong to bear their weight. Much of the day is passed in sleep, but at night they are watchful, and proclaim their uneasiness by a hoarse call or bark from the throat.

The specimen described by Mr. Bennett came from Madras: it was for a time an inhabitant of the menagerie of the Zoological Society of London, and we can vouch for the accuracy of the following description:—

'As far as its manners have yet been developed, it appears to be, with regard to man at least, one of the most playful and good tempered of beasts, soliciting the attention of almost every visitor by throwing its clumsy body into a variety of antic postures, and when noticed, tumbling head over heels with every symptom of delight. But towards animals it exhibits no such mildness of temper; and it is curious to observe the cat-like eagerness with which it watches the motions of any of the smaller among them that happen to pass before its den, and the instinctive dread manifested by the latter on perceiving it. Its food is of a mixed nature, consisting, like that of the bears and other less carnivorous beasts, of bread and milk in the morning, and flesh in the latter part of the day.' (*Zoological Gardens.*)

The Ratel.

Fossil Ursidæ.

To the list of fossil Bears enumerated in the article Bears, and the fossil Gluttons noticed in the article Gulo, we have to add the Raccoon, figured by Dr. Buckland among the recent and fossil animals of the first tertiary period (Eocene of Lyell) and described as found in the gypsum of the Basin of Paris.

The resort of the Raccoons to the seashore in search of oysters, &c., and of the Turkeys to the same locality for the purpose of feeding upon the Fiddler Crabs above noticed, should be borne in mind by those who study the subject of fossil footsteps, ripple-marks, &c.

The great geographical range of the fur-clad genus *Ursus*, in the coldest and hottest regions, suggests the notion that extinct Elephants and Mastodons might have been equally adapted to extremes of climate. The thick fur of the frozen Elephant of Siberia will at once occur to those who think on this subject.

URSINS, ANNE MARIE DE LA TREMOUILLE, PRINCESSE DES, was remarkable in her day for her daring and restless spirit of political intrigue. She was daughter of Louis de la Tremouille, duke of Noirmoutier; was born before 1642, and married, in 1659, Adrein Blaise de Talleyrand, prince of Chalais. Her husband was banished, in 1663, for being engaged in a duel; and she, following him to Italy, was left by his death a widow in a foreign land. In 1675 she married the old and rich duke of Bracciano, head of the Orsini family, after whose death she sold the duchy, and, retaining only his family name, was called 'la Princesse des Ursins,' by which name she is known in history. Rome was in her time looked upon as the best school of state intrigue; and the voluptuous, haughty, subtle, and dexterous princess was soon recognised as one of the leading spirits of that court. In 1701, when Philip V. of Spain was married to the princess of Savoy, the choice of a camerara-major occasioned considerable embarrassment. Louis XIV. neither dared to confide the post to a Spanish lady, nor to give umbrage to the Spaniards by the appointment of a French lady. Madame des Ursins, an Italian princess, though a Frenchwoman by birth, was ultimately fixed upon, and in 1701 she joined her royal mistress at Nice. With the exception of a brief interval (in 1704), the princess retained the post of camerara-major till the queen's death in 1714. Previous to her ephemeral disgrace the princess courted the alliance of the Spanish party at court; after her return she appears to have acted entirely by the direction of Madame Maintenon. After the death of the queen the chief solicitude of Madame des Ursins was to select a new wife for Philip, over whom she might exercise as unbounded a control as over her predecessor. Alberoni, by his false representations of the character of Elizabeth Farnese, persuaded her to promote the king's union with that princess. The first step of the new queen was to drive the camerara-major from court with indignity; a step to which the king submitted without remonstrance, and against which the court of France offered no objection. Hopeless of returning to Spain, the Princess des Ursins retired to Rome, but, unable to live without the excitement of political intrigue, she thrust her services upon the Pretender James Stuart, who allowed her to do the honours of his house, till her death in December, 1722. Madame des Ursins was a mere courtier; her political struggles were exclusively personal. She could make and unmake friendships—supplant favourites—recover power when undermined herself—but of governing a state she does not appear to have had even the shadow of an idea. She was merely one of those idle though gaudy weeds which grow up in courts, and are of no use even when they supplant triflers as worthless as themselves. The memoirs and letters of the Princess des Ursins interest us in the same way that 'Gil Blas' does—by their mixture of passion and adventure. In this point of view her correspondence with the Maréchal de Villeroi, and still more her correspondence with Madame Maintenon (both have been published), are very edifying. It is clear from those letters that all her unquestionable energy and versatility only enabled her to make her power the means of more embroiling the perplexed affairs of Spain during the War of Succession.

URSI'NUS, FU'LVIUS, one of the most eminent Italian scholars of the sixteenth century, was born on the 2nd of December, 1529, at Rome. He was the natural son of a commander of the order of Malta, who belonged to the noble family of the Orsini. During his early years his education was conducted with great care, but afterwards a dispute arose between his mother and his father, in consequence of which she and her child were cast upon the world without any means of subsistence, and she was obliged to seek support by begging. However, some early indications of talent which the boy evinced procured him a place as 'clericus' in the church of St. John in the Lateran. Here he attracted the attention and gained the attachment of a canon of the name of Gentilio Delfini, who not only took him into his house, but also instructed him in the Latin and Greek languages. The amiable character of Ursinus, his industry, and his talents, induced the canon to use all his influence in his behalf; and after Ursinus had been ordained priest, he obtained successively several preferments in the church, and became at last the successor to his benefactor. He now formed the acquaintance and friendship of the most distinguished and learned men in Rome and Italy. Cardinal Rainutius made him his librarian; and, after his death, Cardinal Alexander Farnese engaged his services for the same purpose. In these positions he was very liberally rewarded, and had also opportunities of becoming acquainted with all the treasures of antient literature and art which were then known. Cardinal Caraffa recommended him to Pope Gregory XIII., and procured him an annual pension of 200 ducats. The ample income which he now enjoyed enabled him to spend considerable sums on books, MSS. of antient authors, and a valuable archaeological museum, and to support his mother, for whom he always showed a tender affection. When he was advanced in years he made his will, in which he bequeathed his museum to Cardinal Odoardo Farnese, his MSS. to the Vatican library, his printed books to Horatio Lancelotti, and the sum of 2000 crowns to Gentilio Delfini, bishop of Camarino, who was probably a near relation to his early benefactor. He died at Rome on the 18th of May, 1600.

Fulvius Ursinus possessed very extensive learning, and he was a man of good sense and talent. His knowledge of antient MSS. was very great, and he was particularly skilled in deciphering them. Of this art he appears to have made a sort of secret, upon which he avoided giving any information when he was asked. His works, which are very numerous, consist of commentaries, critical and exegetical, on antient writers, editions of them, and original treatises on antiquarian subjects. Among his commentaries, which are usually very short, but useful for the critical study of the antients, the most important are those on the 'Scriptores Rei Rusticae;' on the Roman historians, such as Sallust, Caesar, Livy, Velleius, Tacitus, Suetonius, Spartianus, and others. These notes on the Roman historians are reprinted at the end of his 'Fragmenta Historicorum Romanorum,' Antwerp, 1595, 8vo. His notes on Sextus Pomponius Festus are printed in several subsequent editions of this grammarian: those on all the works of Cicero appeared at Antwerp, 1581, 8vo., and are also contained in Lambinus's edition of Cicero. Besides the fragments of the Roman historians, he edited a collection of the lyric and elegiac poets of Greece; and in 1582 he published the first edition of the 'Eclogae de Legationibus,' which contained various parts of the works of Polybius, Dionysius, and Appian, which had until then been unknown. Among the original dissertations of Ursinus we may mention:—1, 'Familiae Romanae, quae reperiuntur in antiquis numismatibus,' of which an improved and enlarged edition was published by C. Patin, 1663. It is also printed in vol. vii. of Graevius's 'Thesaurus Antiquitatum Romanarum.' 2, 'Imagines et Elogia Virorum illustrium, e marmoribus, nummis, et gemmis expressae.' The best edition is that of J. Faber (1606), with a commentary. 3, An appendix to Ciaconius's treatise 'De Triclinio Romano.' A Life of Ursinus, in which his will also is printed, was published by Joseph Castalio, Rome, 1657, 8vo. It is reprinted in the 'Vitae Selectae eruditorum quorundam Virorum,' published at Breslau, 1711.

(Compare Tomasini, *Elogia;* Niceron, *Mémoires des Hommes Illustres*, vol. xxiv.; Jöcher, *Allgem. Gelehrten-Lexic.*)

URSI'NUS, ZACHARI'AS, a celebrated German divine of the sixteenth century, was born at Breslau on the 18th of July, 1534. He studied at Wittenberg, and as he was very poor, he was obliged to live on gratuities and on what he could earn by private lessons. His uncommon perseverance and industry gained him the friendship of Melanchthon, who, in 1557, took him with him to the conference at Worms. From Worms Ursinus went to Geneva, and thence to Paris, for the purpose of acquiring a knowledge of French and of studying Hebrew under Mercer. Almost immediately after his return to Wittenberg he was appointed rector of the Gymnasium Elisabethanum at Breslau, in 1558. Being a follower of Melanchthon, he soon became involved in theological controversies with the strictly Lutheran divines of Breslau respecting the nature of the Lord's supper and baptism, and he was designated by the name of 'the Sacramentarian.' He explained his own views on these subjects in a dissertation, but as he could not silence his adversaries, and as he himself was not inclined to continue the controversy, he asked leave to resign in 1560, and went to Zürich, where he met with a kind and hospitable reception from Peter Martyr, Gesner, Simler, and others. He had not been much more than a twelvemonth at Zürich, when he was invited to a professorship in the Collegium Sapientiae at Heidelberg. In the year 1562 he was made Doctor of Divinity, and, at the command of the elector palatine, Frederic III., Ursinus drew up the famous Heidelberg Catechism, which was subsequently adopted by all the German Calvinists as the exposition of their creed. It was fiercely attacked by the Lutherans, such as Flacius, Heshusius, and others. The elector ordered Ursinus to write a defence of it, which appeared in 1563, in German. The attacks upon the elector and his protégé however did not proceed from Lutheran divines alone; and the elector was charged by some princes of the empire with protecting and propagating doctrines contrary to the Augsburg Confession. Ursinus was again called upon to write a defence of his doctrines. This he did in 1563, in a work called 'Exegesis Verae Doctrinae de Sacramentis contra Bacmeisterum.' In 1564 Ursinus attended the colloquy at Maulbrunn, at which he spoke with great energy against Brentius and Schmidlinus, and the doctrine of Ubiquity maintained by them. About the same time the elector founded some new educational establishments at Amberg, Heidelberg, and Neuhaus; and Ursinus, at his request, drew up the rules for their administration. The manner in which he discharged this and other duties raised Ursinus so high in the esteem of his prince, that in 1571, when the professorship of theology in the university of Lausanne was offered to him, and he seemed inclined to accept it, the elector took the pains to persuade Ursinus to remain at Heidelberg. The elector palatine Frederic III. died in 1577, and was succeeded by his son Ludwig, on which a great change took place in the palatinate; for as this prince tolerated only strict Lutherans among his clergy and in the university, Ursinus and his disciples were obliged to quit Heidelberg in 1578, and went to Neustadt, where he was immediately appointed professor of theology at the gymnasium which was just established there. Here Ursinus taught theology and logic, and continued his studies without any further disturbance until his death, on the 6th of March, 1583.

Ursinus was a modest, though very passionate man; but he exercised great control over his passions, and he is said never to have answered an objection immediately. He had no talent for preaching, and he discontinued it as soon as he discovered his unfitness. His diligence and application were extraordinary; and in order that he might not be disturbed by intruders, he put the following inscription on the door of his study:—

> 'Amice, quisquis hic venis,
> Aut agito paucis, aut abi,
> Aut me laborantem adjuva!'

Some of his works were at the time translated into English: for instance, his exposition of the Heidelberg Catechism, under the title of 'Summe of the Christian Religion,' translated by Henry Parrie, 1587, 4to. All his works were collected and published after his death, at Neustadt, 1587; but the best and most complete edition is that which was edited by his former pupils, David Pareus and Quirinus Reuterus, at Heidelberg, 1612, 3 vols. fol.

(M. Adamus, *Vitae Germanorum Theologorum;* Bayle, *Dictionnaire Hist. et Critique*, under 'Ursinus.')

URSI'NUS, BENJAMIN, a descendant of the celebrated Zacharias Ursinus, distinguished himself as a Lutheran preacher during the latter part of the seventeenth and the beginning of the eighteenth century. He was at first court preacher to the elector of Brandenburg. In 1701, when Frederic I. assumed the title of king of Prussia, he made Ursinus bishop, and raised him to the rank of nobility. Ursinus used to begin his sermons with the words 'Once upon a time.' When Frederic I. died, in 1713, his successor, Frederic William I., who employed himself in regulating the finances of his kingdom and reducing the public expenditure, also reduced the salary of his bishop, Ursinus. The bishop petitioned that his former income might be restored: the king replied by a letter, which contained only these words, 'All that was once upon a time.' The sermons preached by Ursinus on various great court occasions are said to be superior to those of other preachers of the time, both in style and matter.

(Jöcher, *Allgem. Gelehrten-Lexicon*, iv., p. 1735.)

URSULINES, an order of nuns in the Roman Catholic church, founded about the year 1537, by Angela Merici, commonly called Angela of Brescia, who was born in 1511, at Desenzano, on the Lago di Garda, and died at Brescia, 21st March, 1540. The institution was formally approved of and confirmed by Pope Paul III., in 1544, and it was upon this occasion that the name of Ursulines was given to the order, after the famous British Saint Ursula, respecting whom and her 11,000 (or, as others say, 71,000 virgins), the reader may consult, besides the Martyrologies, Selden's note on the eighth song of Drayton's 'Polyolbion.' It appears however that Angela, who, young as she was, had been elected the first superior of her order, and had ruled it with great wisdom for the two or three years she lived, had selected or suggested this designation for it before she died. The approbation of his predecessor was renewed by Pope Gregory XIII., in 1571, with additional privileges, which were afterwards confirmed by Sixtus V. and Paul V. The order of the Ursulines was designed mainly for the succour of poverty and sickness, and for the education of the young; and wherever it was established the nuns principally devoted themselves to these services, in rendering which they mixed freely with the world, much in the same manner as the members of the various orders of Charity have always been accustomed to do. At first indeed they neither bound themselves by the usual irrevocable vows, nor even lived together in communities; and there appear to have been always some members of the order who continued to reside with their families or by themselves at their own houses. In course of time however the Ursulines, like the other religious orders, came for the most part to be distributed in monasteries, especially in France, where they chiefly flourished. The first house of Ursuline nuns was founded at Paris, in 1604, by Madame de Sainte Beuve, and the members first took the three solemn vows in 1614, in conformity with a bull of Paul V., granted 13th June, 1612. A note on the article 'Angela Merici' in the Supplement to the 'Biographie Universelle' states that there were before the Revolution 115 dependencies on the chief house of the order at Paris, including one established at Quebec in Canada. But Helyot, in his 'Histoire des Ordres Monastiques,' says that when he wrote (1715) there were more than 350 Ursuline convents in France. For further information respecting the Ursulines, both of France and other Roman Catholic countries, the reader may consult this last-mentioned work, vol. iv., chapters 20 to 32 inclusive, pp. 150-223. Helyot gives twenty plates of the costume of the order, which appears to have been black in some countries and white in others, and to have varied in other respects, as well as in colour.

URSUS. [BEARS; URSIDÆ.]

URTI'CA (from *uro*), a genus of plants known under the common name of Nettle. Nettle is the same word as the Anglo-Saxon *netel*, or *nædl*, a needle, which is applied to these plants on account of their possessing small bristles or prickles which have a stinging property. This genus is the type of the natural order Urticaceæ. The flowers are either monœcious or diœcious. The staminiferous flowers have a single perianth of 4 leaves, containing the rudiment of a pistil. The pistilliferous flowers have a single perianth of 2 leaves; a sessile stigma, and a dry fruit containing a single seed. Most of the species are herbaceous plants or under-shrubs, and are found in Europe, Asia, and America. Three of the species, of which there are about forty, are British.

Urtica pilulifera, the Roman Nettle, has opposite, ovate, serrated leaves, with transverse nerves, and the pistilliferous flowers pedunculated, and arranged in globose spikes. This plant is found in England, under walls and amongst rubbish, principally near the sea, in the counties of Norfolk and Suffolk. It has also been found in the south of Ireland. This is the most virulent of our native nettles. Its stinging properties depend upon the possession of a form of hair, which has at its base a bag of poisonous secretion, which is forced into the hair when pressed, and produces the stinging effects which are common to several species of the genus. [STINGS.]

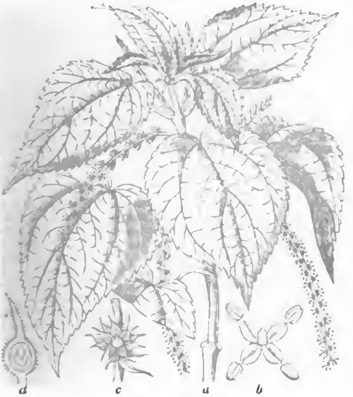
U. dioica, the Great Nettle, has ovate-acuminate leaves, cordate at the base; the flowers are diœcious in clusters, much branched, and the clusters in pairs. This is a very common plant throughout Europe, in waste places, under walls and hedge-banks. The tops of this plant, when young in spring, are sometimes eaten as a potherb, especially amongst the humbler classes in Scotland. Walter Scott, in his 'Rob Roy,' alludes to this practice when Fairservice says, 'Nae doubt I should understand my ain trade of horticulture, seeing I was bred in the parish of Dreepdaily, near Glasco', where they raise lang-kail under glass, and force the early *nettles* for their spring-kail.' They are not often now cultivated. The stalk of this plant yields a strong woody fibre, like that of hemp, and is capable of being manufactured into cloth, ropes, paper, &c. The root, when boiled with alum, yields a colouring-matter which will dye yarn of a yellow colour. A decoction of this plant salted will coagulate milk very readily without giving it any disagreeable flavour. The caterpillars of many butterflies and moths feed upon its leaves. As a medicinal agent, it is said to possess diuretic and astringent properties, and 'nettle-tea' is a popular remedy for many diseases. In the green state few animals will eat the common nettle, but when dried it is readily eaten by sheep and oxen.

U. urens, Small Nettle, has opposite elliptical leaves with about 5 nearly parallel ribs, with nearly simple clusters of flowers. This plant possesses the stinging properties of the two last. It is common in cultivated ground, especially gardens throughout Europe.

Though nettles are so common in Europe, the finest species are found in tropical countries: some extend from the Malayan Peninsula all along the Himalayan Mountains, and some of them, from the beauty of their foliage, might even be ranked among ornamental plants. Indeed Dr. Roxburgh has named one of his species *U. pulcherrima*, as it is remarkable for its long and tapering, narrow lanceolate, beautifully serrate, elegantly-veined leaves, which are hoary on the under surface. Some of the Indian species do not sting, but others possess this property in a very conspicuous degree: as for instance *U. heterophylla*, *crenulata*, and *stimulans*, the first of which is a 'most ferocious-looking plant,' and may be seen in the Calcutta Botanic Garden always surrounded with a fence, as the least touch of any part produces most acute pain. One species has been called *U. tuberosa*, as it is remarkable for its tuberous rootstocks, which are eaten by some of the natives of India, either raw, boiled, or roasted. The plant was introduced into this country, and bore its tuber-like rootstocks, which was bland in taste, and might no doubt have furnished food for cattle, as it might have grown without culture under hedge-rows; but the winter was too severe and destroyed the plants. The most important species of this genus however is *U. tenacissima*, which, like some of the other nettles, as well as the hop and the hemp, belonging to the same natural family, abounds in ligneous fibre, which may be converted into very strong cordage. This is 'the *Caloee* of Marsden, *Rami* of the Malays, a native of Sumatra, also of Rungpore, where it is called *kunkhura*, and which Dr. Roxburgh found one of the strongest of all the vegetable fibres which he subjected to experiment. The average weights with which lines made of the different substances broke were, *Asclepias tenacissima*, jetee of the Rajmahl mountaineers, 248; *Urtica tenacissima*, caloee, 240; the strongest *sunn*, *Crotolaria juncea*, 160; hemp, *Cannabis sativa*, grown in the year 1800, in the East India Company's hemp-farm, near Calcutta, 158, but much stronger when tanned. European hemp was however always found stronger than sunn, though not more so than the others. Dr. Roxburgh speaks of the beauty, fineness, and softness of the fibre of the Caloee. It is cultivated in Sumatra for the fibres of its bark. The Malays use it for sewing-thread and twine, and for making fishing-nets. It is as readily cultivated as the willow from cuttings, grows luxuriantly in the northern as in the southern parts of India, throws up numerous shoots as soon as they are cut down, which may be done about five times a year. Dr. Roxburgh however found some difficulty in cleaning the fibres of this plant, notwithstanding his anxious desire to succeed with this substitute for both hemp and flax.' (Royle, *Himal. Bot.*, p. 334.)

URTICA'CEÆ, a natural order of plants, placed by Lindley in his Rectembryose group of incomplete Dicotyledons. The plants belonging to this order are trees, shrubs, d herbs, yielding in some instances a milky juice. The aves are alternate, and usually covered with asperities or ith hairs furnished with a stinging secretion; the stipules e membranaceous, and are deciduous or convolute in rnation. The flowers are monœcious or diœcious, either attered or collected together in catkins or in close heads. he calyx is membranous, lobed, or persistent. The amens are definite in number, not united, and inserted to the calyx opposite its lobes; the anthers during æsti-ation are curved inwards, but are turned backwards with asticity after bursting. The ovary is superior, containing solitary erect or suspended ovule with a simple stigma. he fruit is either a simple indehiscent nut, surrounded y a membranous or fleshy calyx, as in Boehmeria, *Fig.* 1; r it is a fleshy receptacle, either covered by numerous uts lying among the persistent fleshy calyxes, as in Dor-eina, or the nuts are enclosed in the cavity of the recep-acle, as in the common fig, *Fig.* 2; or it may consist of a ingle nut covered by a succulent involucre. The embryo s straight, curved, or spiral, sometimes without albumen; he cotyledons are flat and the radicle points to the hilum.

Fig. 1.



Boehmeria cordata.

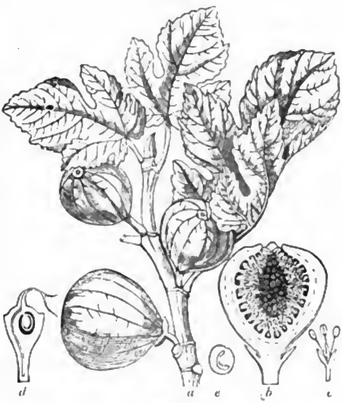
a. Branch with flowers; b, single flower; c, collection of fruits; d, section of fruit, lying in which is seen the seed and embryo.

The order, as thus defined, includes several groups of plants which are frequently separated, as the Artocarpeæ of Robert Brown, the Batideæ of Martius, and the Moreæ of Endlicher. This order is closely allied to Chenopodiaceæ, as is shown by its occasionally curved embryo, and almost all other characters, with the exception of the rough surface of the leaves, the possession of stipules, and elastic stamens. From Euphorbiaceæ they are distinguished by their fruit not being tricoccous; from Ulmaceæ, by their monœcious flowers and simple fruit; and from Polygonaceæ, by their not having ochreate stipules. The arrangement and naming of the genera of this order have been much neglected; the best attempt is that of Gaudichaud: Endlicher however objects to several of his genera.

The plants belonging to this order have a very general dispersion over the world. Some of them grow in the most northern regions of the globe, whilst others are found in the tropics; some of them will grow amongst rubbish and dry walls where hardly a speck of other vegetation occurs, whilst others only inhabit the damp recesses of gloomy forests. The species are very numerous, many of them being mere weeds, whilst others are large trees yielding useful and delicious fruits.

This order brings together plants possessing very different properties, and yielding very various and useful products. The stinging nettles [Urtica] form the type of the order. To it belongs also the deadly Upas. [Antiaris.]

Fig. 2.



Ficus Carica.

a, Branch with leaves and figs; b, section of a fig, showing the flowers enclosed within the fleshy receptacle. c, male flowers separated; d, section of ovary; e, section of seed, showing curved embryo.

The wholesome fig, the celebrated banyan, and species yielding deadly poisons, belong to the genus Ficus. [Ficus.] The bitter hop [Humulus], the acid mulberry [Morus], and the narcotic hemp [Cannabis], are also found here. The famous cow-tree, or Palo de Vacca of South America, which yields a copious supply of rich and wholesome milk, is supposed to belong to this order. [Cow-tree.] The sap of many of the species, especially those belonging to the division Artocarpeæ is milky. [Artocarpeæ.] This depends on the presence of caoutchouc, which in many instances is procured from the plants of this order. The *Cecropia peltata*, a tree found in Jamaica, is said to yield the caoutchouc called American. Cecropia comes from a supposed Greek word, 'to cry out,' a sort of translation of its English name, Trumpet-wood. It has this name because its hollow stems and branches are used for the purpose of forming wind-instruments. The wood is light, and it is often used for making fishing-floats, and the bark is manufactured into cordage. The ligneous part is very dry and will catch fire by attrition; and of this the native Indians take advantage for producing fire by rubbing the Cecropia against some harder wood. The spontaneous combustion of forests is in some instances attributed to the attrition of branches of this tree during a high wind. The fruits are crowded together like the acini of the common raspberry, and are not unlike that fruit in flavour. They are a favourite food of pigeons and other birds. The seeds of a plant nearly allied to Cecropia, called Musanga by the Africans of the Gold Coast, are eatable as nuts. The Osage Orange, *Maclura aurantiaca*, belongs to this order. This plant is a tree with deciduous leaves, and spreading spiny branches, attaining a height of from 30 to 60 feet. The leaves are ovate, acuminate, of a bright shining green, broad, with a cuspidate point, and about 3 inches long and 2 inches broad. The spines are simple, rather strong, and about an inch in length. The flowers are small and greenish, with a slight tinge of yellow. The fruit has the size and appearance of a large Seville orange. It consists of radiating, elongated cells, terminating in a tuberculated surface, and containing numerous seeds. When pressed a considerable quantity of a sweetish milky fluid exudes, which coagulates on exposure to the air. This tree is a native of North America, and is found on the banks of the Red River and the adjoining valleys. It was first obtained from the Osage Indians, [illegible] which it has derived the name of Osage [illegible]. [illegible] this plant were first sent to England in 1818, and [illegible] several plants now growing in this country [illegible] fruit of this plant, when ripe, is of a [illegible] although it possesses no injurious properties, it is not anywhere used as an article of diet. In some cases the fruit has been brought to perfection in Europe. The wood of this tree is of a bright yellow colour, and is very fine-grained and elastic, and on this account it is used by the American Indians for bows. Hence it is called in America yellow-wood and bow-wood. Attempts have been made on the Continent to feed silk-worms on the leaves of this tree, instead of those of the mulberry, but the attempt has not been found to be successful. It seems to bear the climate of Great Britain well, and promises to become a valuable addition to our timber trees. It is easily propagated by cuttings of the roots or by layers, and it will grow in almost any kind of soil. The name Maclura was given to this plant by Nuttall, in honour of Mr. Wm. Maclure of the United States, who is well known for his labours in the natural history of North America. The genus *Borya*, named after Bory St. Vincent, a French naturalist who investigated the botany of the Mauritius and the Island of Bourbon, yields several shrubs which are cultivated in Europe. They are deciduous shrubs, growing to the height of from 6 to 12 feet, and having a dark brown or purple bark, and small dark green opposite leaves. About six species have been described: they are all of them natives of North America.

(Lindley's *'Natural System;* Loudon, *Arb. et Frut. Brit.; Cyclopædia of Plants;* Burnett's *Outlines.*)

URUBU. [Turkey Buzzard.]

URUMIYEH, LAKE. [Azerbijan; Persia.]

URUS. [Bison, vol. iv., p. 463; Ox, vol. xvii., pp. 77-78.]

URVILLE, J. DUMONT D', a French navigator and naturalist. He is known in the scientific world as having made several valuable contributions to the science of botany. One of his earliest contributions to botany was a memoir on the plants which he had himself collected in the Grecian islands, and which was published at Paris in 1822, with the title 'Enumeratio Plantarum quas in insulis Archipelagi aut Littoribus Ponti Euxini, annis 1819 et 1820, collegit atque detexit.' In the Memoirs of the Linnæan Society of Paris in 1826, he published a Flora of Falkland's Island, with the title 'Flore des Malouines.' In the sixth volume of the 'Annales des Sciences Naturelles' he published an essay on the distribution of the ferns over the surface of the earth. These are his principal labours as a botanist, but D'Urville will be better known to posterity as an able, persevering, and successful navigator. In 1826 he was appointed by the king of France to the command of the frigate 'Astrolabe,' for the purpose of making a voyage in search of information with regard to the unfortunate La Perouse and his companions. The vessel left Toulon in March, 1826, and continued out till 1829. During the first part of his voyage D'Urville failed of attaining the object of his voyage, but having put in at Hobart Town in Van Diemen's Land, he heard that Captain Dillon had obtained information with regard to the object of his search at the island of Vanikoro, or Malicolo. He accordingly sailed for that island, and reached it in January, 1828. Here he found undoubted evidence of the wreck of the two frigates, on the breakers of this island, which were under the command of La Perouse. This island is one of the group called Solomon's Islands, in 11° 41′ S. lat. and 167° 5′ E. long. Having ascertained that the lives of many of the sailors had been saved from the wreck, but that they had built another vessel and sailed from the island, D'Urville erected a monument to the memory of those who perished, and returned home. Some of the portions of the wrecks of the two vessels were recovered. During this voyage very important surveys of coasts and islands were made; among them a survey of the north part of New Zealand, Tongatabou, Fidjee Archipelago, Loyalty, Deliverance, New Britain, New Ireland, New Guinea, Fataka, Vanikoro, Hogollu, Guam, and the Moluccas. A full account of this memorable voyage was published in 1830 and successive years, by D'Urville. This work is a splendid contribution to science. The five volumes descriptive of the voyage were written by D'Urville; one volume, on the botany of the islands of the South Seas, was written by Lesson and Richard; one volume, on the entomology, by Boisduval; and four volumes, on the zoology of the same districts, by Quoi and Gaimard. The work was accompanied by an atlas of 45 maps, 243 plates of views, portraits of natives, &c., and above 100 plates of objects in natural history. The title of this work is 'Voyage de la Corvette l'Astrolabe, executé par ordre du Roi pendant les années 1826, 1827, 1828, 1829,' Paris, 8vo., plates folio.

In 1837 D'Urville had placed under his command the frigates 'Astrolabe' and 'Zélé,' for the purpose of making a voyage to the South Pole. In a first attempt he reached the latitude 64°, and explored to some extent what he thought to be a new coast; he was obliged however to retire on account of the icebergs. Having remained for some time at Conception, he made a second attempt, and discovered a coast at 66° 33′ S. lat. and 138° 21′ E. long. He found himself here close to the south magnetic pole, the magnetic needle becoming nearly vertical. The coast thus discovered appeared one mass of ice, but portions of rock here and there projected, from which specimens were obtained by means of a boat's crew. It appears that the same land was discovered the same day by an American vessel in lat. 64° 20′, and 154° 18′ E. long. It is also stated that the expedition now in the South Sea, under the command of Captain Ross, has reached the south latitude 71°. The land thus discovered by D'Urville he named after his wife Adelie. He was of opinion that 'this land surrounds the greater portion of the polar circle, and will present itself at all points to the mariner who is bold enough and fortunate enough to clear the mass of ice which usually girdles it.' On his return to Paris he published an account of this expedition with the official reports of the minister of marine, under the title 'Expedition au Pole Austral et dans l'Océane des Corvettes de sa Majesté,' Paris, 1839.

This brave sailor and excellent man met with his death on the 8th of May, 1842, by the unfortunate railway accident that occurred between Versailles and Meudon, by which himself, with his wife and son, and nearly fifty fellow passengers, were killed. Kunth's genus of sapindaceous plants, *Urvillea*, was named in honour of him.

(*Nautical Magazine*, 1832 to 1840; Bischoff, *Lehrbuch der Botanik.*)

USANCE. [Bill of Exchange.]

USBEG, or USBECK. [Tartars, p. 75; Turkistan.]

USE. A use, at common law, was a beneficial interest in land, distinct from the legal property therein. The origin of uses is derived by Gilbert (*Law of Uses*, 3) from a title under the civil law, which allows of an usufructuary interest, distinct from the substance of the thing itself, and which was called in that law the *fidei commissio.* He says it was introduced by the clergy, who were masters of the civil law, and who, 'when they were prohibited from taking anything in mortmain, after several evasions by purchasing lands of their own tenants, suffering recoveries, purchasing lands round the church and making them churchyards by bull from the pope, at last invented this way of conveying lands to others to their own use; and this being properly matter of equity, it met with a very favourable construction from the judge of the Chancery court, who was in those days commonly a clergyman. Thus the way of settlement began; but it more generally prevailed among all ranks and conditions of men by reason of the civil commotions between the houses of York and Lancaster, to secrete the possessions, and to preserve them to their issue, notwithstanding attainders; and hence began the limitation of uses with power of revocation.' But whatever may have been the origin of uses, it is certain that the desire of effecting frequent and secret transfers of property without resorting to the simple and public modes of conveyance of the common law, as well as the natural desire to dispose of property by devise, which the common law did not allow, led to an early adoption of the system.

The requisites and qualities of a use, as existing previous to the statute 27 Hen. VIII., c. 10, will be best understood by a reference to the definition given of it by Lord Coke, namely, 'a confidence reposed in some other, not issuing out of land, but as a thing collateral, annexed in privity to the estate of the land, and to the person touching the land, for which *cestui que use* has no remedy but by subpœna in Chancery.' (Co. Lit., 272 b.) (1) It was *a confidence*, and therefore, with respect to the feoffee to uses, it was held indispensable that there should be *confidence in the person.* For want of this requisite it was held that a corporation could not be seised to a use. (2) A use was *not issuing out of the land, but as a thing collateral to it.* A legal charge, as a rent, issues directly out of the land, but a use was not a part of, but an incident to, the land, depending on certain adjuncts; for it must have been

3) *annexed in privity to the estate*, that is to say, it must tand or fall with the legal estate of him who stands seised o the use, and is not binding upon persons coming in by a uperior and independent title. Thus if a feoffment had een made to A for life to his own use, with remainder to in fee for the use of C, and afterwards A had enfeoffed in fee—in this case D, as he did not take the identical state in the land to which the use in favour of C was atached, would not, unless he took the estate with notice of he use, have been bound by C's equitable claim. And for he same reason neither the lord coming in by escheat nor disseisor could be liable to the execution of a use: the ord, because he claims by title paramount; a disseisor, beause his possession is adverse. (4) A use is also said o be *annexed in privity to the person*. In order to enitle the *cestui que use* to relief in equity, he was obliged o show that the person against whom he proceeded had otice of the use, or, as it is now called, of the trust, at the ime of his taking the estate. With respect to the original rantee to uses, this privity must of course exist; and with espect to assigns, if they took the estate with actual noice of the use, they were of course privy to it, and bound o give it effect, whether they had paid a valuable consieration or not; while if they were volunteers, *i. e.* if they ook the estate without consideration, they were always onsidered as affected with notice by presumption of law, nd therefore bound. (5) The *cestui que use had no reedy but by subpœna in Chancery*. Originally the only ledge for the due execution of a use was the faith and tegrity of the feoffee to uses, as the *cestui que use* could btain no relief in the courts of common law; but John altham, bishop of Salisbury, who was chancellor in the eign of Richard II., invented the writ of subpœna, whereby e feoffee or trustee was liable to be summoned into Chanery to answer upon oath as to the execution of his trust.

A use was descendible, according to the rules of the ommon law respecting estates of inheritance; the courts equity having in this case followed the maxim that *quitas sequitur legem*. It was also alienable by deed, and evisable before the statute of wills, the courts of equity aving favoured this method of evading the strictness of e common law, which allowed no transfer of land witht the ceremony of livery of seisin. But the *cestui que e*, with respect to the legal ownership, had still neither *s in re* nor *ad rem*. The feoffee was still complete wner of the land at law. He performed the feudal duties, s wife had dower, and his estate was subject to wardship, lief, &c. He might sell the lands, and forfeit them for eason or felony.

By the 15 Rich. II., c, 5, it was enacted that lands coneyed to the use of religious houses or bodies corporate ould be subject to the statutes of mortmain; and this state was afterwards extended by the 23 Hen. VIII., c. 10, o as to render void declarations of uses for parish churches, apels, churchwardens, companies, &c., erected by comon consent, and not being bodies corporate. By the 21 II., c. 3, forfeitures for treason were extended to lands hereof the person was seised as *cestui que use*. But the rst important statute with respect to uses was the 1 Rich. II., c. 1, which gave the *cestui que use* the power to aliate the possession as well as the use, and was evidently tended for the benefit of purchasers; but so far from eing effectual for that purpose, it rather increased the failities for frauds upon them: for as it did not deprive the offees of the power of alienation, they had it still in eir power, by alienating the land for a valuable conderation and without notice, to defeat the conveyances of he *cestui que use*; besides which the feoffees and *cestui ue use* often colluded together, and, by making separate onveyances, purposely defeated each other's alienation r the purpose of deceiving purchasers. The 1 Hen. VII. ade an action of *formedon* maintainable against the ernors, *i. e.* the persons in receipt of the profits of lands nfeoffed to uses. It having been found that by the introuction of uses lords lost the benefit of wardship, it was rovided by the 4 Hen. VII., c. 17, that the heir of *cestui ue use* of lands held by knight-service, being within age, hould be in ward, and, being of full age, should pay reief; and, for the benefit of the heir of *cestui que use*, it as also provided that he should have an action against is guardian for waste. By the 19 Hen. VII., c. 15, the ands of *cestui que use* were made subject to execution r debts by judgment, recognizance, statute merchant, and of the staple. The lands of *cestui que use* held in socage were also made liable to satisfy to the lord his relief, heriot, and other duties. *Cestui que use* was also allowed to have the same advantages as if he had been tenant of the land. And, lastly, the lands of *cestui que use*, being a bondman, were made seizable by the lord.

The system of uses having been found to produce many inconveniences, notwithstanding the statutes which had been passed from time to time to modify them, it was thought a remedy would be found by joining the possession to the use, or, as it is usually termed, transferring uses into possession. With this view the statute of 27 Hen. VIII., c. 10, commonly called the Statute of Uses, was passed, which enacted, that where any person or persons stood or were seised, or at any time thereafter should happen to be seised of any honours or other hereditaments to the use, confidence, or trust of any other person or persons, or of any body politic, by any manner of means whatsoever it should be, that in every such case all such person and persons, and bodies politic, that had or thereafter should have any such use, confidence, or trust in fee simple, fee tail for term of life, or for years or otherwise, or any use, confidence, or trust in remainder or reverter, should from thenceforth stand and be seised, deemed, and adjudged in lawful seisin, estate, and possession of, and in the same honours and hereditaments with their appurtenances, to all intents, constructions, and purposes in the law, and in all such like estates as they had or should have in use, trust, or confidence of or in the same; and that the estate, title, right, and possession that was in such person or persons that were or thereafter should be seised of any lands, tenements, or hereditaments, to the use, confidence, or trust of any such person or persons, or of any body politic, should be from thenceforth clearly deemed and adjudged to be in him or them that had or should have such use, confidence, or trust, after such quality, manner, form, and condition as they had before in or to the use, confidence, or trust that was in them.

The statute then provides for the case of several persons being jointly seised to the use of any of them; and contains two savings, 1st, To all persons (other than persons who were seised or thereafter should be seised of any lands, tenements, or hereditaments, to any use, confidence, or trust) all such right, title, entry, interest, possession, writs, and action, as they had or might have had before the making of the Act; and 2nd, To all persons seised to any use, all such former rights as they had to their own proper use in, or to any manors or hereditaments whereof they should be seised to any other use.

It has been questioned whether or not the legislature intended by this act to put an end to the system of uses; nevertheless it was soon settled that it had not that effect, but that uses might still as formerly be raised, upon which the statute would instantly operate. However, some modifications of the system were introduced. Before the statute a mere agreement for sale, without words of inheritance, was sufficient to pass the equitable fee to the vendee; but by the 27 Hen. VIII., c. 16, it was enacted that no contract should transfer the legal estate in the fee, unless it were made by deed enrolled. [BARGAIN AND SALE.] And it was resolved by the judges that words of inheritance were necessary to pass the fee at law. Indeed no contract importing a future conveyance, even though made by deed enrolled, and containing words of inheritance, would now be held to transfer the legal estate under the Statute of Uses, though it would entitle the vendee in equity to call for a regular conveyance. A further modification of the system of uses was introduced by the seventh section of the Statute of Frauds (29 Car. II., c. 3), which required that all declarations of trusts or confidences of lands, tenements, or hereditaments (which might formerly have been created by parol), should be manifested and proved by writing, signed by the party by whom it is declared. [TRUST.]

In order to raise a use which the statute will turn into a possession, it is necessary that there should be, 1st, one person seised to the use of another, *in esse*; 2nd, a use *in esse*, limited in possession, reversion, or remainder. The use may be either *express*, as where lands are conveyed to A and his heirs in trust for B and his heirs, or in confidence that he and they shall take the profits, or where a vendee, for a valuable consideration, conveys by bargain and sale enrolled, in both which cases the legal estate vests in the grantee or bargainee by the statute; or it may be *implied*, as where a feoffment is made without consideration or declaration of the use, in which case the use results, and the estate returns to the grantor.

It was settled by the courts of law that the statute could not operate except upon an estate of freehold, and that therefore copyhold and leasehold estates are not affected by it. A term of years may of course be created out of a freehold estate by way of use, but when once subsisting cannot be conveyed to uses. If, therefore, a term were assigned to A to the use of B, the legal estate would remain in A, who however would be considered in equity as a trustee for B.

By the operation of the Statute of Uses, a man may, through the medium of a feoffee or releasee, make a conveyance to his wife, which he could not do at common law (Litt., s. 168; Co. Litt., 112 a.). In like manner a married woman, having a power, *i. e.* a right to limit a use, may appoint to her husband.

At common law a man could not limit a remainder to himself, nor could he limit it to his heirs so as to make them take as purchasers, without departing with the whole fee simple out of his person (Dyer, 156 a, fol. 24; Co. Litt., 22 b.), but he may do so by means of a conveyance operating under the Statute of Uses.

It is a rule of the common law that joint tenants cannot take at different periods. (1 Co., 100, b. 2.) Again, by its rules, a fee could not be limited upon a fee; a freehold could not be made to commence *in futuro*, and an estate could not be made to cease by matter *ex post facto*, so as to let in another limitation before the expiration of the former. [REMAINDER.] But limitations of the above kinds may be made to take effect under the statute of uses. Such limitations are called ***shifting or secondary and springing uses;*** and ***future or contingent uses.***

Shifting or Secondary Uses are properly such as take effect in derogation of some other estate, and are either limited expressly by the deed, or are authorised to be created by some person named in the deed: as if an estate were limited to the use of A and his heirs, with a proviso that if B pay 10*l*. the estate shall go to B and his heirs. Shifting uses seem to have existed before the statute, when, as the legal estate remained in the feoffees, the rule of the common law, which did not allow the fee to change from one to another except upon breach of a condition annexed to the estate at its creation, was not violated. They are now of constant occurrence in settlements of property. [SETTLEMENT.] The rules against perpetuities in settlements of property are applicable to shifting uses, which must be limited to take effect within the same period, namely, that of a life or lives in being, and twenty-one years afterwards, unless where they are to take effect after an estate tail, in which case, as the tenant in tail may defeat the use by barring the estate tail, such a limitation has no tendency to a perpetuity.

Springing Uses, though often confounded with shifting uses, are more properly such as are limited to arise in a future event where no previous use is limited; as in the case of a bargain and sale to take effect ten years hence, where the use in the mean time remains in the grantor. They are subject to the same limits as shifting uses.

Future or Contingent Uses are properly such as are limited to take effect as remainders; such as a use to the first unborn son of A, after a limitation to him for life or for years determinable with his life. The rule of law, that a vested freehold must precede a contingent remainder, did not apply before the statute to contingent uses, because the freehold remained in the feoffees; but, since the statute, they are subject in this respect to the rules of contingent remainders. [REMAINDER.]

A right to create a shifting or future use given to some agent or person nominated in the deed is called a *power*. Every power of this kind is a power of revocation and new appointment; for the new uses and estates created by the execution of the power must necessarily in so far revoke and defeat the previously existing uses. Sometimes an express power of revocation is given to the donee of the power, but this is unnecessary.

Powers deriving their effect from the statute of uses are of three kinds. 1st, *powers appendant and appurtenant*, which are so termed because they strictly depend upon the estate limited to the person to whom they are given, and take effect, when executed, either wholly or in part out of that estate: as when a man is tenant for life with a power of granting leases in possession for terms of years; 2nd, *powers collateral* or *in gross*, which are powers given to a person who had an interest in the estate at the time of the execution of the deed creating the power, or to whom an estate is given by that deed, upon which the estates to be created by the power will not attach. A power reserved by a person who being seised in fee simple settles his estate upon others, and a power to a tenant for life to appoint the estate after his death among his children, or to jointure his wife out of it, are powers of this kind. It seems also that a power given to a stranger, who has an estate to charge the estate for his own benefit, is a power in gross; 3rd, *powers simply collateral*, which are powers given to a person who has no interest in the land, and to whom no estate is given, to dispose of or charge the estate for the benefit of some other persons. The most familiar instance of such powers is that of a power given to a stranger to revoke a settlement, and appoint new uses to other persons named in or pointed out by the deed.

The law relating to the creation, execution, and extinguishment of powers forms in itself a most extensive and important branch of law learning, of which it is impossible to give even an outline within the limits of this article, but which will be found fully discussed in Sugden's *Treatise of Powers*.

Much discussion has arisen as to the mode in which the statute is to be considered to operate in the case of future and contingent uses. Thus, if a feoffment were made to A and his heirs, to the use of B and his heirs, until C should pay a sum of money, and then to the use of C and his heirs, the use is executed in B and his heirs by the statute; and this use, being co-extensive with the seisin of A, there can be no actual seisin afterwards remaining in him: but when C pays the money, the use is executed in him, and the question then is, out of whose seisin the shifting use is served. To avoid this difficulty it was said that though no actual seisin remained in A, yet, upon the cessor of the use to B and his heirs, the original seisin reverted to A for the purpose of serving the secondary use, and this supposed possibility of reverter, upon payment of the money, was called the *possibility of seisin*, or *scintilla juris*. The same principle was applied to limitations, such as that to the use of A for life, remainder to the use of his unborn son in tail, remainder to the use of B in fee. The consequence of this doctrine was considered to be that, if a contingent use were divested, an actual entry must be made to revest it, although a right of entry is sufficient to support a contingent remainder at common law: from which it would result that as, by force of this *scintilla*, the feoffees might enter to revest the contingent uses, they might also divest themselves of this right of entry by feoffment, release or otherwise, and so prevent the uses from ever arising. But the better construction of the statute seems to be that, upon a conveyance to uses operating by transmutation of possession, as a feoffment or lease and release, immediately after the first estate is executed, the releasees to uses are divested of the whole estate; the estates limited previously to the contingent uses take effect as legal estates; the contingent uses take effect as they arise, by force of and in relation to the seisin of the releasees under the deed; and any vested remainders take effect according to the deed, subject to open and let in the contingent uses. (See Sugden, *Treatise of Powers*, 2nd 12-47.)

As the Statute of Uses was made previously to the Statute of Wills (32 & 34 Hen. VIII.), it has been questioned whether the former can be held to apply to the latter: but as, before the statute, devises of the use were permitted, so, since the statute, the courts have uniformly held that, where a devise is made to a use, the intention of the testator must be taken to be that the devisee of the use should have the legal estate.

By a construction of the Statute of Uses, adopted soon after it was passed, the grounds of which it is not easy to understand, it was settled that a use could not be limited on a use, that is, that the statute would operate on the first declaration of use only: so that if, by bargain and sale, a use in lands were limited to A and his heirs in trust, or to the use of B and his heirs, the statute would vest the legal estate in A without adverting to the use declared in favour of B. The Court of Chancery availed itself of this construction to revive Uses under the name of Trusts; and it was determined that A was, in the case above mentioned, a trustee for B of the beneficial interest in the land. It is not true however, as has been said by Lord Hardwicke, that the Statute of Uses 'has had no other effect than to add at most three words to a conveyance;' for the Court of Chancery, availing itself of its exclusive jurisdiction over trusts, and aware of the mischiefs attendant upon uses before the statute, has gradually established a system well adapted to answer the exigencies of family settlements and provisions, without producing any of those evils which the statute of Henry VIII. was intended to remedy. [TRUST AND TRUSTEE.]

The subject of this article is elaborately treated in Sanders, 'On Uses and Trusts;' and in Gilbert, 'On Uses,' by Sugden.

USES, CHARITABLE AND SUPERSTITIOUS. The term 'Charitable use,' as understood in law, is of very extensive application, and includes dispositions of property which cannot with any propriety be described as charitable, but which are so called with reference to the purposes enumerated in the statute 43 Eliz., c. 4, or such as are considered analogous to them. That statute enacted that the Commissioners thereby empowered should inquire as to the lands, &c. given by well-disposed people 'for relief of aged, impotent, and poor people; for maintenance of sick and maimed soldiers and mariners; schools of learning, free-schools, and scholars in universities; for repair of bridges, ports, havens, causeways, churches, sea-banks, and highways; for education and preferment of orphans; for or towards the relief, stock, or maintenance of houses of correction; for marriage of poor maids; for supportation, aid, and help of young tradesmen, handicraftsmen, and persons decayed; and for relief or redemption of prisoners and captives, and for aid or ease of any poor inhabitants concerning payment of fifteens, setting out of soldiers, and other taxes.' Many gifts not within the letter have been held to be within the equitable construction of this statute; and when the gift is to charity in general, without any particular purpose being specified, it will be carried into effect either by the Crown or the Court of Chancery, upon principles which the determinations of that court have established. The term 'Charitable use,' in law, is applied exclusively to gifts for what are called public charities, the objects of which are not particular individuals, but a class or the public in general.

A superstitious use, in its original sense, was where lands, tenements, rents, goods or chattles, were given, secured, or appointed for or towards any of the following purposes, viz.: the maintenance of a priest or chaplain to say mass; for the maintenance of a priest or other man to pray for the soul of any dead man in such a church or elsewhere; to have or maintain perpetual obits, lamps, torches, &c., to be used at certain times, to help to save the souls of men out of purgatory. See the 15 Rich. II., c. 5; 23 Hen. VIII., c. 10; and 1 Ed. VI., c. 14. The statute of Richard II. was passed for the purpose of subjecting lands conveyed to uses to the law of mortmain. The statute of Henry VIII. relates only to assurances of lands to churches and chapels, which, if for a longer term than 20 years, it declares to be absolutely void. By the 1st of Edward VI. certain superstitious uses then existing were forfeited to the king, but the statute has no prospective operation. There is no statute making superstitious uses void generally, but the king as head of the commonwealth, and as intrusted by the common law to see that nothing is done in maintenance or propagation of a false religion, was considered entitled to pray a discovery of a trust to a superstitious use, and to order the property to be applied to a proper use. The same principle has been applied to many cases of gifts of property for purposes which cannot properly be classed as superstitious uses, but are either expressly prohibited by the law of the country or contrary to its policy. A change in the doctrine of superstitious uses has been made by the 2 and 3 Wm. IV., c. 115, which puts persons professing the Roman Catholic religion upon the same footing, with respect to their schools, places for religious worship, education and charitable purposes, as Protestant dissenters; with respect to whom the doctrine of the court is, that it will administer a fund to maintain a society of Protestant dissenters promoting no doctrine contrary to law, though at variance with that of the Established Church. The 2 and 3 Wm. IV., c. 115, is retrospective. (2 M. and K., 225.)

The Court of Chancery has a general jurisdiction over property given for charitable purposes, and the regular mode in which matters relating to charities are brought before it is by information by the attorney-general on behalf of the crown.

The Court of Chancery adopts a very liberal construction of gifts for charitable purposes; and there are numerous cases of gifts for objects not within the letter of the statute of Elizabeth which have been considered to be within the equitable meaning of the word charity as understood in that court, and have been administered accordingly. And when a gift is made for charity generally, without any purpose specified, if the gift be to trustees, the court will order a scheme to be prepared for the direction of the trustees in the administration of the trust; and where the declared object is charity, but no trust has been interposed, the right to dispose of the property, and to declare the particular charitable purposes to which it is to be applied, belongs to the Crown by sign manual. Where the particular objects which the donor had in view fail, either wholly or in part, the court adopts what is called the principle of administration *cy-pres*, that is, it directs the property to be applied to worthy objects in its judgment most nearly resembling those which have failed, or when more than one charity has been named by the donor, to such of the others as are still subsisting. When the revenue of the property increases from any cause, the increase goes to the charity, if it appear to have been the intention of the donor that the whole should be disposed of in that manner; otherwise the increase will go to the legal representative of the donor. In cases where the revenue of the property was distributable among several charities, the question has been, in what manner the increase of income was to be disposed of among them. The principle established by the cases seems to be, that a charity to which a fixed annual sum has been given has no right to participate in the increase, but that one entitled with the other charities to a proportionate part of the original income will have a right to a similar proportion of the increase.

When property is given to a superstitious use, or for a charitable purpose which the law will not allow to be carried into effect, the court, upon the not very satisfactory ground that the property was meant for a charity, will apply it to some other charity of which it approves. In the words of Sir William Grant, 'Whenever a testator is disposed to be charitable in his own way and upon his own principles, we are not content with disappointing his intention, if disapproved by us: but we make him charitable in our way and on our principles. If once we discover in him any charitable intention, that is supposed to be so liberal as to take in objects not only not within his intention, but wholly adverse to it.' (7 Ves., 495.) If the superstitious use be one which the court considers charitable, the fund goes to the king to be disposed of to such charitable uses as he shall direct by sign-manual: if the use be not charitable, the gift is merely void, and the property will go to the donor's representative. (2 M. and K., 684.)

The regular mode of proceeding in cases of abuse of charitable funds is by way of information in the name of the attorney-general on behalf of the crown. In informations with respect to charities the Court of Chancery always requires a person to be joined with the attorney-general, who is styled the relator, and is answerable for the conduct and costs of the suit. This is done because the crown never pays costs, in order to protect the defendants by making the relator pay the costs, should the suit appear to have been improperly instituted.

The above-mentioned Act of the 43rd of Eliz. empowered the Court of Chancery to issue commissions to inquire into the abuse or misapplication of property given for charitable purposes, but the proceedings under this act were found so unsatisfactory that they gradually fell into disuse, and recourse was again had to the original method of procedure by information.

By the 52 Geo. III., c. 101, commonly called Sir Samuel Romilly's Act, the legislature provided a summary remedy in cases of abuses of charitable trusts, or where the aid of the Court of Chancery was required for the administration of them. That act empowered any two or more persons to present a petition to a court of equity praying the requisite relief, which the court might thereupon grant in a summary manner.

By the 59 Geo. III., c. 91, continued by the 2 Wm. IV., c. 57, the attorney-general was empowered to institute a suit by information without a relator, upon five or more of the commissioners of charities thereby appointed certifying that the case was one requiring the interference of the court.

The jurisdiction of the Court of Chancery over property given to charity must be distinguished from the authority frequently exercised by the lord chancellor or lord keeper as visitor of charities. Charities are either under the management of individual trustees, or are established by charter as eleemosynary corporations. On the institution of a corporate charity, a visitorial jurisdiction arises of common right to the founder and his heirs, whether he be the king or a private person, or to those whom the founder has appointed for that purpose; and the office of visitor is to determine the differences of the members of the society, and to superintend generally the government of the body, in accordance with the statutes originally propounded by the founder. With this visitorial power the Court of Chancery has nothing to do, its right of interference being confined entirely to the administration of the property. When the charity is of royal foundation, the visitorial power of the king is exercised by the lord chancellor as his representative; and even where the founder of the charity was a private person, if he has made no appointment of a visitor, and if his heir cannot be discovered, or has become lunatic, the visitorial power, rather than that the charity should not be visited at all, results to the crown, and, as in the case of royal foundations, is exercised by the lord chancellor. The mode of application in these cases is not by way of information, but by petition addressed to the Great Seal.

Certain restrictions have been put upon the power of making gifts of property to charitable uses by the 9th of Geo. II., c. 36, commonly, though improperly, called the Mortmain Act. By it devises of land and bequests of money to be laid out on land or in any interest in land are declared void. For an explanation of the provisions of this act, see MORTMAIN.

(See Duke's *Law of Charitable Uses;* Boyle, *Law of Charities.*)

USHER (in Latin *Usserius*), JAMES, a most learned and distinguished Irish prelate, was born at Dublin, 4th January, 1580. His father, the descendant of an antient family, founded by an Englishman of the name of Nevil, who in exchange for that had assumed the name of his office on coming over to Ireland with Henry II.'s son John in the quality of usher, about 1185, was Arnold Usher, one of the six clerks of the Irish court of chancery; his mother was a daughter of James Stanyhurst, who was thrice elected speaker of the Irish house of commons, and held the offices of one of the masters in chancery and recorder of the city of Dublin. A brother of his father's, Henry Usher (about whom there is an article in Bayle), was archbishop of Armagh from 1595 to 1613: a brother of his mother's was Richard Stanyhurst, who (as well as his sister and his father) latterly became a Roman Catholic, and is the author of a translation of the first four books of the 'Æneid' into English hexameters, besides several learned theological and historical works, of one of which, his 'Descriptio Hiberniæ,' an English translation is printed in Holinshed's Chronicles.

Usher, who was his father's eldest son, is said to have been taught to read by two aunts who had been blind from their cradle. He was then sent, at eight years of age, to a school kept in Dublin by two secret political emissaries of King James of Scotland, Mr. (afterwards Sir) James Fullerton and Mr. James Hamilton (afterwards created Viscount Clandeboye in the Irish peerage). The concealed political agents were excellent scholars and teachers, and Usher in after life used to attribute whatever proficiency he had made in learning mainly to the five years during which he had the benefit of their instructions. From their seminary he proceeded in 1593 to the newly-opened university of Trinity College, Dublin, of which he was one of the first three students that were admitted.

He had already acquired a high academic reputation, when in 1598 the death of his father, who had intended to educate him for the law, left him at liberty to follow his own inclinations, which led him to the study of theology. Upon coming to this determination he made over his paternal inheritance to his younger brothers and his sisters, only reserving a small annuity from the rental of the property (which it seems was much involved by lawsuits, as well as otherwise encumbered). Having then taken his degree of M.A. in 1600, he was the next year ordained both deacon and priest by his uncle, the archbishop of Armagh.

His first appointment, which he received very soon after, was of Sunday afternoon preacher before the state, as it was called, in Christ Church, Dublin. Two visits which he made to England in 1603 and 1606, to purchase books, the first time for the library of Trinity College, the second time for himself, brought him into acquaintance with Sir Thomas Bodley, Sir Robert Cotton, Camden, and other distinguished persons of the day, whose admiration appears to have been strongly excited by the extensive acquirements he had made at so early an age. From this time he usually made a journey to England every three or four years, when his practice was to spend one month at Oxford, another at Cambridge, and the rest of his stay in London, principally in the Cottonian Library. In 1607 having proceeded bachelor of divinity, he was chosen professor of that faculty in his college, and this post he held for the next thirteen years. This same year also he was made chancellor of the Cathedral of St. Patrick. In 1609 he was unanimously chosen provost of Trinity College, but declined the office, through an apprehension, it is said, of its duties interfering with his studies. In 1612 he took his degree of D.D.; and the next year, being at London, he there published in 4to. his first work, entitled 'De Ecclesiarum Christianarum Successione et Statu:' it is a continuation of Bishop Jewel's 'Apology for the Church of England' (also written in Latin); but it remains itself unfinished both in this first edition and in the reprints of Hanover in 1658, 8vo., and at London in 1687, 4to. along with his 'Britannicarum Ecclesiarum Antiquitates', although in the last impression falsely described on the title page as 'Opus integrum ab auctore auctum et recognitum.' Usher had from the first been a zealous opponent of popery, which he maintained the law ought to discountenance not only as politically objectionable, but as idolatrous; he was also in doctrine a decided Calvinist and Predestinarian; and, besides being opposed to the Arminian principles, which were now coming into vogue, he did not profess in the matter of church government to hold the same high notions as to the divine right of episcopacy with many of the clergy. In consequence of all this he had obtained the reputation of being inclined to Puritanism, and some pains had to be taken by his friends to satisfy the king's mind on this point; but the representations that were made by influential persons in Ireland, and by Usher himself, were so successful, that in 1620 James nominated him to the see of Meath. In 1623 he was made a member of the Irish privy council; and in January, 1624, while he was in England (where he was detained by illness till August, 1626) he was raised to the archbishopric of Armagh and the primacy of the Irish church. For some years after this his life was passed tranquilly in the administration of the affairs of his see and the prosecution of his studies. In 1631 he published, all at Dublin, in 4to., certain writings of the old theologian Godeschalc, in defence of predestination, with illustrations, under the title of 'Godeschalci et Predestinarianæ Controversiæ ab eo motæ Historia' (said to have been the first Latin book printed in Ireland); in 1632 a collection of letters of Irish bishops from the sixth to the thirteenth century, under the title of 'Veterum Epistolarum Hibernicarum Sylloge;' in 1638 his 'Emanuel, or a Treatise on the Incarnation of the Son of God,' reckoned one of his greatest performances, and reprinted in 1643 at Oxford, in 1645 and 1648 at London, in 4to., and again at London in 1670, in folio; and in 1639 his celebrated 'Britannicarum Ecclesiarum Antiquitates,' also several times reprinted.

In the beginning of 1640 he came over to England, with the intention of staying a year or two at most; but he never again saw his native country. He took up his residence in the first instance at Oxford, and there published in 1641, a 4to. volume of theological dissertations, under the title of 'Certain Brief Treatises.' The same year he was plundered of nearly everything he possessed in Ireland by an attack of the rebels upon his house at Armagh; and in the state of that country, it seems to have been thought needless for him to return to his archbishopric. Upon this the king, Charles I., conferred on him the bishopric of Carlisle, to be held in commendam; but of this he is said to have made very little; and when soon after the revenues of the bishops were confiscated by the parliament, he did ot receive the pension of 400*l.* a year that was allotted or his support above once or twice. Meanwhile, connuing to reside mostly at Oxford, where he preached very Sunday at one or other of the churches, he published here, in 1644, in 4to. an edition, in Greek and Latin, of he Epistles of Polycarp and Ignatius, reprinted at London n 1647. Soon after this he left Oxford, and retired first to he house of his son-in-law, Sir Timothy Tyrrell, at Cardiff; hence, after a stay of six months, to the castle of St. Donate, n the invitation of the dowager Lady Stradling; thence in 646 to London, to the house of his friend the countess of eterborough, near Charing Cross. In 1647 he was chosen reacher to the society of Lincoln's Inn, upon which he ook up his residence in a suite of apartments provided for im in the inn, and had his library, the only part of his roperty he had saved, removed thither. He preached egularly during term time in the chapel of the inn for early eight years. In 1647 he published his treatise De Romanæ Ecclesiæ Symbolo,' and the next year his earned 'Dissertatio de Macedonum et Asianorum Anno olari.' In the end of the year 1648, during the negotiaion between the king and the parliament about the settlenent of the church, his majesty sent for Usher to come to im at the Isle of Wight; and here a scheme which had een drawn up by the archbishop seven years before, and hen rejected by Charles, was now proposed by him anew, ut, although accepted by the king, was rejected by the arliamentary commissioners. It was published by Dr. ernard at London in 1658, under the title, by which it is ommonly known, of 'The Reduction of Episcopacy to he Form of the Synodical government in the Antient hurch.' In 1650 Usher published at London, in folio, he first part of his great work, his 'Annales Veteris et ovi Testamenti,' which was followed by the second part n 1654: other editions of both parts, all in folio, appeared t Paris in 1673, at Bremen in 1675, and at Geneva (the est) in 1722. The only other works he sent to the press ere his 'Epistola ad Ludovicum Capellum de Variantibus extus Hebraici Lectionibus,' 4to. London, 1652; and his Syntagma de Græca LXX. interpretum Versione,' 4to. ondon, 1655, and again Lipsiæ, 1695. He died at Lady eterborough's house, at Ryegate in Surrey, after a day's llness, on the 21st of March, 1656; and his remains were nterred in Westminster Abbey by order of Cromwell, who s said however to have left the relations of the deceased relate to pay the greater part of the expense of the public uneral. By his wife Phœbe, daughter of Dr. Luke Chaloner, whom he married in 1613, and who died about a ear and a half before him, Usher left only one daughter, lizabeth, who became the wife of Sir Timothy Tyrrell. Tyrrell, James.] In addition to the works above menioned, several others were printed from his papers after is death: 1, 'The Judgment of the late Archbishop,' c., published by Dr. Nicholas Bernard, 8vo. Lond. 1658; 2, 'Chronologia Sacra,' &c., published by Dr. Thomas arlow (afterwards bishop of Lincoln), 4to. Lond. 1660; 3, 'The Judgment and Sense of the present See of ome,' also by Dr. Bernard, 8vo. Lond. 1659; 4, 'The ower of the Prince and Obedience of the Subject stated,' y his grandson, James Tyrrell, 4to. Lond. 1661; 5, A olume of Sermons; 6, 'Historia Dogmatica Controversiæ nter Orthodoxos et Pontificios de Scripturis et Sacris ernaculis,' by Henry Wharton, 4to. Lond. 1690; 7, 'A ollection of Three Hundred Letters written to James Usher, ord archbishop of Armagh, &c., collected by Richard arr, D.D., his lordship's chaplain at the time of his death,' olio, Lond. 1686. To this collection Parr has prefixed an mple biographical memoir of the archbishop; and there re lives of Usher, in Latin, by Dr. Bates (in the 'Collectio atesiana'), and by Dr. T. Smith (in his 'Vitæ Eruditisimorum,' and also prefixed to the Geneva edition of the Annales'). Bayle, who has a short article on Usher, refers to what he calls a good abridgment of his life in a eview of Parr's collection in the 'Bibliothèque Universelle,' ol. ii., pp. 219-244. There is a very full account in the Biographia Britannica,' vol. vi., part i., pp. 4062-4081.

USICZA. [Servia.]

USK. [Monmouthshire.]

U'SNEA, a genus of plants belonging to the natural amily of Lichens. This name is said to have originated n the Arabic name *ăchneh*, or *ăchnĕn*, a name given to all ichens. The whole plant is much branched, filiform, nostly pendulous, and furnished within with a bundle of elastic fibres; the reproductive organs (apothecia) are orbicular, terminal, peltate, and often ciliate at the border. The Usnea plicata, in common with the Roccella tinctoria and other lichens, is used as a dye.

USPALLA'TA. [Plata, p. 218.]

U'STICA. [Palermo; Sicily.]

USTIUG VELIKI (*i. e.* Great Ustiug) is a considerable town in the government of Wologda in Russia in Europe, situated in 60° 47′ N. lat. and 46° 5′ E. long., at the confluence of the Suchona and the Jug, which two rivers, by their junction, form the Dwina, which falls into the White Sea at Archangel. It is an antient town, built in the Russian fashion; the houses are for the most part of wood; there are two cathedrals, twenty-three churches, five convents, and several buildings and warehouses belonging to the crown. The climate of the circle of which it is the capital is very raw and cold, so that it has not much superfluity of natural productions for commerce; but the town, being situated on the direct road from Archangel to Siberia, and to the southern provinces, may be considered as one of the most important commercial towns of northern Russia. The inhabitants have a considerable trade with Archangel, St. Petersburg, Casan, Costroma, Yaroslav, and Novogorod, which is greatly facilitated by many navigable rivers. The chief articles which pass in transit are Russian productions from the other governments, the furs of Siberia, silks and tea from China, and fish from the North Sea. The inhabitants have also manufactures of linen, woollen, leather, soap, candles, hosiery, and wooden utensils, and there are in the town many gold and silversmiths, whose works in enamel and bronzed silver are much esteemed.

(Hassel, *Handbuch*, vol. xi.; Stein, *Lexicon*, by Hörschelmann; Cannabich, *Lehrbuch*.)

USUCA'PIO. Gaius (ii. 40-42) states that if a Res Mancipi was transferred by bare tradition, without the forms of Mancipatio or in Jure Cessio, the original owner retained the Quiritarian ownership, and the person to whom the thing was transferred had only the right to the enjoyment of the thing until by possession he had acquired the ownership (possidendo usucapiat). For the effect of such enjoyment was to give him the same rights with respect to the thing as if it had been transferred in due legal form. In the case of moveables the Twelve Tables fixed one year as the term of Usucapio; in the case of land and houses, two years. The acquisition of the Quiritarian ownership of a thing by enjoyment of it under the circumstances above stated for these several periods was called Usucapio.

Gaius states that there might also be Usucapio in the case both of things Mancipi and things Nec Mancipi which had been transferred by bare tradition from a person who was not the owner, provided the transferree received them in good faith (bonâ fide), or, in other words, believed that he received them from the owner. It seems probable that this rule of law was established by analogy to the rule of the Twelve Tables as to Res Mancipi which had been transferred by defective modes of conveyance. But the Twelve Tables may have fixed only the time of Usucapio: the origin of Usucapio may be anterior to the Twelve Tables.

When Gaius wrote (in the second century of our æra), Usucapio, as it appears, had become a regular mode of acquiring ownership; for property of all kinds might be so acquired which had been received by tradition and bonâ fide from a person who was not the owner. The case of things stolen, or the possession of which had been acquired by violence (vis), was an exception, for even if received bonâ fide they could never become the property of the receiver by Usucapio. The Res Mancipi of women also, who were in the tutela of their agnati, could not be objects of Usucapio unless they had been received from her by traditio with the proper consent (auctoritas) of her tutor; and the hereditas of a woman who was in tutela legitima could not be an object of Usucapio. As land (fundus) could not, according to the best opinion, be an object of furtum, a bonâ fide purchaser of land from a man who was not the owner, and knew he was not the owner, might acquire the property of it by Usucapio, provided the seller had not acquired the possession by violence, but had either taken possession of land which was vacant through the carelessness of the owner, or from the owner dying without a successor, or having been long absent.

Besides individual objects of property, Usucapio could exist in the case of servitutes, and marriage, and in the case of an Hereditas. Originally such Servitutes as followed the rule of law as to Res Mancipi could only be transferred like Res Mancipi; and therefore Usucapio could only apply to such servitutes. But by analogy to Res Mancipi, they could be acquired by bare contract, to which Usucapio was superadded; and when Mancipatio at a later period was replaced by bare tradition, they could be acquired by contract simply. In the case of marriage, when there was no co-emptio, the woman might come into the power of her husband by virtue of uninterrupted cohabitation for one year; and she was then said to become a part of his Familia by usucapio founded on a year's possession. (Gaius, i. 111.) In the case of the Hereditas, when the testator had not disposed of his property by the necessary forms of the Mancipatio and Nuncupatio, the person who was named heres in the will could only acquire his legal title as such by Usucapio.

These various instances will show the original notion of Usucapio. It was a legal effect given to bonâ fide possession and enjoyment for a fixed time, by which defects in the transfer of a thing were made good: it was not originally a mode of acquisition. It was founded on a title good in substance, but defective in form; and this defect was supplied by the proper period of enjoyment (usus). When this usus had continued for the legal time, it gave its auctoritas (as the Romans expressed it), its efficiency and completeness to what was in its origin incomplete; and the phrase Usus Auctoritas was older than the expression Usucapio, which was afterwards the ordinary term. But Usus by itself never signified Usucapio; for Usus alone could not give a title to the ownership of a thing. In the case of public land the possessor had the usus, but this was all that he could be entitled to as possessor. Such usus could not from the nature of the case have an auctoritas, for the possessor did not occupy the public land as a bonâ fide purchaser. A man might also have the usus of private land without having a title to anything further: in which case also the usus could never have an auctoritas. In the Roman law, as known to us in the Pandect, Usucapio appears as a mode of acquisition, which must have been owing to the circumstance of Mancipatio ceasing to be regarded as important: for bare tradition in all cases, followed by the proper usus, gave complete ownership. Finally, when the difference between Res Mancipi and Nec Mancipi was abolished, Usucapio in its original sense ceased. But as in the time of Gaius we find usucapio applicable to the case of things Nec Mancipi, which a person had possessed bonâ fide, this rule of law still continued, and various limitations were in course of time established as to the mode of acquiring the ownership of a thing by the enjoyment of it. Thus Justinian, in his 'Institutes' (ii., tit. 6), after reciting the old law, refers to one of his Constitutions, by which the ownership of moveables might be acquired by use (usucapiantur), provided there was a bonâ fide possession (justa causa possessionis praecedente) for three years, and that of immovable things by the 'longi temporis possessio,' which he explains to be ten years 'inter praesentes,' and twenty years 'inter absentes;' and the Constitution applied to the whole empire. Usucapio is defined in the 'Digest' (xli., tit. 3, s. 3) to be the 'addition of ownership by the uninterrupted possession for a time fixed by law.' As it was the addition of ownership, something is here implied to which this addition was to be made; and this something was a bonâ fide possession.

The subject of Usucapio admits and requires a much more complete exposition. The reader may refer to the following works:—Engelbach, *Ueber die Usucapion zur zeit der zwölf Tafeln*, Marburg, 1828; and Mühlenbruch, *Doctrina Pandectarum*.

USUS. [USUFRUCTUS.]

USUFRUCTUS, or USUSFRUCTUS, and USUS, belonged to the class of Servitutes Personarum among the Romans. Ususfructus is defined (*Dig.*, 7, tit. 1, s. 1) to be 'the right to use and take the fruits (fruendi) of what belongs to another without impairing its substance.' Usus is defined (*Dig.*, 7, tit. 8, s. 1, 2) to be the right 'to use, but not to take the fruits (frui).'

The objects of ususfructus might be land (fundus), houses (ædes), slaves, beasts of burden, and other things. He who was entitled to a Ususfructus was called Usufructuarius, or Fructuarius. A right to a Ususfructus might be given to a person by testament, or it might be established by contract.

Generally, it may be stated that all the 'fructus,' or produce of a thing that accrued during the time of enjoyment, belonged to the Fructuarius; but his title to fructus was not complete till he had taken them, and it was a general rule that any 'fructus' which had not been got in or taken at the time when the Ususfructus ceased did not belong to him. The law as to things that yield an increase, such as fruit-trees and animals, did not present many difficult questions. As to houses and lands, the questions were sometimes more difficult. The Fructuarius was entitled to the rents and profits of houses during his time of enjoyment, and he was bound at least to keep them in sufficient repair, but probably not to rebuild them, if they were in a ruinous condition. He was bound to cultivate land in a proper husbandlike manner. He could work existing mines and quarries for his benefit, and he could also open new mines and work them. The fructuarius could maintain his rights to the ususfructus by actions and interdicts. The period of ususfructus might either be for a fixed time or for the life of the fructuarius. At the termination of the period of enjoyment, the thing was to be given up to the owner, who could generally require security for its being properly used and given up in proper condition.

The usus of a thing, as already explained, was a right to the enjoyment of a thing, but not to the produce or profits of it. Yet in some cases the usus of a thing implied a right to a certain amount of produce. Thus the usus of cattle implied that the usuarius was entitled to a moderate allowance of milk; and a man who had the usus of an estate could take wood for his daily use, and could enjoy the orchard and other things in moderation. If a man had the usus of oxen, he could employ them for all purposes for which oxen are properly used. The duties of the usuarius resembled those of the fructuarius.

The rules of law which related to the Ususfructus and Usus were numerous. Many of them are collected in the *Digest*, lib. 7; see also 'Fragmenta Vaticana,' *De Usufructu;* and Mühlenbruch, *Doctrina Pandectarum*.

USUMASINTA. [MEXICAN STATES.]

USURPATIO is sometimes used by the Roman jurists in the sense of interruption of Usucapio. But the verb 'usurpo' and its derivatives are commonly used in the sense of 'using,' or 'employing,' in any way that is suitable to the character of the object used or employed. The participle 'usurpatus' sometimes signifies the acquisition of a right by use: thus 'usurpatam mulierem' (according to the ordinary reading in Gellius, iii. 2) means a woman who had come into the power of her husband by uninterrupted matrimonial cohabitation for one year. (See Savigny, *System des Heutigen Römischen Rechts*, iv., p. 365, on the passage of Gellius, which is a quotation from Q. Mucius Scaevola, the pontifex.) The word is also used in the sense of taking possession of a thing; and in course of time the notion of wrong was attached to the word. Ammianus Marcellinus (xxvi. 7, ed. Gronov.) uses 'usurpator' in a sense somewhat like the modern 'usurper,' when he says 'usurpator indebitæ potestatis.'

USURY. [INTEREST.]

UT, in Music, the name given by the French to the C of the diatonic scale, called *Do* by the Italians and English.

UTICA, a city of Zeugitana, in Africa, near the mouth of the river Bagradas. It was one of the oldest Tyrian colonies on the coast of Africa. In the Second Punic War it stood a siege by Scipio. At the beginning of the Third Punic War it surrendered to the Romans; and when the Roman province of Africa was formed out of the conquered territory of Carthage, the seat of proconsular government was fixed at Utica. It was the scene of several great events during the civil wars of Rome, and it became especially famous as the death-place of the younger Cato. [CATO.] It was made a colony by Augustus, and ranked as the second city of Africa after Carthage. Utica was built on the sea-coast, but by the alteration of the coast its site has been left some distance inland. Its ruins are seen at Bow-Shater. (Shaw's *Travels*, p. 79, 4to. edition.)

UTRECHT, one of the ten provinces of the kingdom of the Netherlands, situated between 51° 55′ and 52° 20′ N. lat., and 4° 40′ and 5° 30′ E. long. It is bounded on the north by Holland and the Zuiderzee; on the east by Gelderland; on the south by Gelderland and Holland;

and on the west by Holland. Its area is 510 square miles; and the population, according to the latest return, 147,681. In the northern and western parts, and on the banks of the Leek, the surface is level and low; and only towards the south-east, between Utrecht and Amersfort, there are some low hills, which slightly vary the monotonous appearance of the country. The soil in the low parts is rich and fertile; in the more elevated tracts sandy, with here and there some low thickets, extensive heaths, and peat-moors. It is watered by the Rhine and its branches, and by several canals. The climate is not so damp as that of the province of Holland: the air is pure and healthy, and there is good fresh-water. The natural productions are the common domestic animals, poultry, fish, bees, corn, pulse, garden-fruit, culinary vegetables, flax, hemp, and tobacco. The manufactures are chiefly in the towns of Utrecht and Amersfort, and the Moravian settlement at Zeyst: these are principally woollen, cotton, silk, linen: there are also breweries and distilleries. The exports are corn, cattle, swine, butter, cheese, some manufactured goods, bricks, and tiles.

UTRECHT, the capital of the province, is situated in 52° 7′ N. lat., 5° 6′ E. long., in a pleasant country, at the bifurcation of the branch of the Rhine called the Old Rhine, and the Vecht. The Rhine divides the city into two parts, and there are likewise two canals with thirty-six drawbridges. The position of the city is healthy, and free from the inconvenience of damp, so common in Holland, it being situated on a dry and rather elevated soil, with a descent towards the river. The approaches to the city are very beautiful, especially that from Amsterdam, which consists of a broad avenue, bordered with rows of trees. The appearance of the city itself is antique, many of the houses being in the Gothic style. It was formerly strongly fortified, but the ramparts have been converted into public walks. There is a beautiful walk called the Maliebann (or Mall), above half a mile in length, planted with eight rows of lime-trees. It is one of the finest in Europe, and Louis XIV. expressly commanded it to be spared, when his army destroyed everything else. The cathedral, a considerable part of which is in ruins, is worthy of notice on account of the tower, 388 feet high, from the summit of which there is a most extensive prospect, embracing 20 large and 30 small towns. There are besides 7 Dutch Calvinist churches, 1 Lutheran, 1 Anglican, 1 French Calvinist, 1 Moravian, and 3 Roman Catholic churches. The town-house is a handsome modern building. The university, founded in 1634, enjoys considerable reputation, though it is not so celebrated as that of Leyden: it has five faculties, and is amply provided with all the necessary appendages, a botanic garden, observatory, &c. This is the head-quarters of the Jansenists, who have here an archbishop and chapter. The city has many charitable institutions, a society of arts and sciences, a society of painters, and a Bible Society. The population is about 45,000: the inhabitants manufacture woollen-cloths, silk, lace, needles, and have some sugar-houses and bleaching-grounds.

(Hassel, *Handbuch*, vol. ix.; Stein, *Lexicon;* Murray, *Handbook for Travellers in Holland;* and Brockhaus, *Conversations Lexicon*.)

UTRECHT, A. VAN. [VAN UTRECHT, A.]

UTRECHT, TREATIES OF. [TREATY, p. 174.]

UTRICULA'RIA, a genus of plants belonging to the natural order Lentibulariæ. This name is derived from *utriculus*, 'a little bladder,' in reference to the structure of the appendage of the root. The genus is known by the calyx having two equal leaves, a personate spurred corolla, a two-lipped stigma, a globose capsule of one cell, and several seeds fixed to a central receptacle. There are only three species of this genus described, and they are all inhabitants of Great Britain. The metamorphosed leaves attached to the roots of all the species are furnished with little bladders, which, when the plant is growing at the bottom of a ditch or pond, are filled with water. But as it is necessary that the plant should flower and ripen its seeds at the surface of the water, these little bladders, at certain seasons of the year, become filled with air instead of water, and the plant is borne by their buoyancy to the surface of the water. When the ripening of the seed is perfected, and it is necessary for the planting of the seed that it should be carried to the bottom of the water, the air in the bladders is replaced by water, and the whole plant sinks to the bottom of the water again.

U. vulgaris, Greater Bladderwort, or Common Hooded Millfoil, has a conical spur, with the upper lip as long as the entire palate; the leaves finely divided. Not unfrequent in ditches and deep pools. It flowers in June and July.

U. intermedia, Intermediate Bladderwort, has the upper lip twice as long as the palate, and the leaves tripartite. It is a much less frequent plant than the preceding. It may be mistaken for the last species, but its flowers are smaller, of a pale yellow, and have a longer lip: the stems also are more leafy.

U. minor, Lesser Bladderwort, has a spur extremely short, obtuse, and keeled, with an upper lip as long as the palate, and the leaves subtripartite. It is a smaller plant than the last. The flowers are a very pale yellow, and small.

These plants are not susceptible of cultivation. They are more numerous in hot than in temperate climates, forming an elegant ornament in the pools and streams wherein they grow. The flowers soon perish, and are so very delicate, that they cannot be dried for the herbarium.

UTRI'CULUS, in Botany, a form of fruit. It is characterised by being one-celled, one or few seeded, superior, membranous, and frequently dehiscent by a transverse incision. It differs from the pyxidium in having originally a simple structure, and does not proceed from an ovarium with obliterated dissepiments. The utricle is seen in the fruits of the Amaranthus and Chenopodium. This form of fruit is called a cystidium by Link.

UTTOXETER. [STAFFORDSHIRE.]

UVA'RIA, a genus of plants of the natural family of Anonaceæ, so named from *uva*, 'grape,' its fruit growing in bunches like grapes. This genus is nearly allied to Unona. The carpels are numerous, fleshy; many celled; many seeded, with the seeds disposed in a double row. *U. zeylanica* is a rambling shrub, a native of Ceylon, with scarlet, starry flowers, and eatable fruit. Several of the species are ornamental, and others have berries of a sweetish taste, which may be eaten. The species form trees or shrubs. Natives chiefly of India and the Indian islands, with a few in Africa. Several of those formerly placed in this genus are now considered to belong to Unona.

UVIGERI'NA. [FORAMINIFERA, vol. x., p. 348.]

U'VULA is the small cylindrical body which hangs at the middle of the posterior margin of the soft palate. It is covered by a continuation of the mucous membrane of the palate, and contains in its interior some minute glands, like those of the palate and the root of the tongue, and a muscle named *azygos uvulæ*, which passes from the posterior spine of the hard palate to the end of the uvula, and has the power of elevating and shortening it. These, with a loose and fine connecting fibro-cellular tissue, make up the whole substance of the uvula.

The only purpose which the uvula is known to serve is that of filling up the gap which remains between the arches of the palate even when they are most approximated. It is subject to no peculiar diseases, but almost always participates in the inflammation of a sore throat. That which is called a relaxed sore throat consists chiefly in an enlargement, with œdema of the uvula. In this state it is long enough to come into frequent contact with the root of the tongue, so as to produce a sensation as if there were something to be swallowed, or a sense of choking when it reaches to the epiglottis. The best treatment for this annoyance is the application of stimulants and astringents in gargles, such as are used in chronic cynanche. [CYNANCHE.] If these fail, the uvula should be cut off; an operation neither painful nor dangerous. The uvula should be seized with a double hook, and cut off close to the palate with a pair of curved blunt-pointed scissors.

The excision of the uvula has been employed for the cure of stammering, and has often produced a temporary improvement of the speech: but no lasting benefit follows the operation, and its only advantage seems to be that it is less painful and dangerous than the other equally useless proceedings which have been adopted for the same purpose.

UVULA'RIA, a small genus of the natural family of Melanthaceæ, so named from the diminutive of *uva*, a bunch of grapes. The perianth is corol-like, composed of six leaflets, each with a nectariferous depression at the base. Stamens 6, anthers opening outwards. Ovary three-celled, with many seeds in two rows. Style simple. Stigmas three, revolute. Capsules three-celled, three-valved, valves bearing the partitions in the middle. Seeds with a fleshy umbilicus. Embryo small, cylindrical within the fleshy albumen. This is usually accounted a North American genus, with some doubtful species in China and Japan. So those found by Dr. Wallich in the Himalayas, and referred by him to this genus, were considered by the late Mr. Don to belong to Diosporum; but the characters of both genera require more minute examination. The species of both genera are very similar in habit; all are easily cultivated, but have little beauty to recommend them.

UXBRIDGE. [MIDDLESEX.]

UZ. [GERMANY, p. 196.]

UZEL. [CÔTES DU NORD.]

UZERCHE. [CORREZE.]

UZE'S, a town in France, capital of an arrondissement, in the department of Gard, about 430 miles south-south-east of Paris, through Auxerre, Lyon, Valence, and Le Pont St. Esprit. It was evidently a town in the time of the Romans, from the remains which have been discovered; and the name 'Ucetia,' not mentioned by any antient geographer or historian (unless it be the same as the Castrum Uceciense in the 'Notitia Provinciarum Galliae'), but found in an inscription dug up at Nîmes, probably belonged to it. It was the seat of a bishopric, suppressed at the Revolution; but the townsmen embraced in the sixteenth century the cause of the Reformation. They were obliged to submit to the royal forces in 1629, when the ramparts of the town were razed and its privileges taken away.

It stands on an eminence not far from the little river Seine, which flows into the Gardon. It is ill laid out and ill built. The principal object of attention is the ex-episcopal palace, with its handsome terrace and park. The population of the commune, in 1826, was 5622; in 1831, 6162 (of whom 5679 were in the town itself); and in 1836, 5049. Hosiery, coarse woollens, and silk goods, paper and cardboard, are manufactured. The bread is very light, and is remarkable for its whiteness. Trade is carried on in silks, brandy, wine, oil, and grain. There are three fairs in the year. Uzès has a subordinate court of justice, one or two fiscal government offices, a communal school, and an agricultural society. The theologian Abauzit was a native of Uzès

The arrondissement of Uzès has an area of 573 square miles: it comprehends 98 communes, and is subdivided into 8 cantons or districts, each under a justice of the peace. The population, in 1831, was 83,752; in 1836, 85,701.

(*Dictionnaire Géographique Universel*; Vaysse de Villiers, *Itinéraire Descriptif de la France*; D'Anville, *Notice de l'Ancienne Gaule.*)

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V.

, as pronounced by the English, is the pressed or medial abial aspirate, bearing the same relation to *f* that *b* oes to *p*. Its form is only a variety of the character by which the vowel *u* is denoted, the latter being in its origin the cursive character employed with soft materials, while *v* is better adapted for writing on stone. The Roman letter *v* was probably pronounced as a *w*, a supposition which would explain the fact that in the alphabet of that language one character is employed for both *u* and *v*. The converse of this appears in the German alphabet, where *w* has nearly the power of *v*, while the latter symbol is used to designate the sound of the English *f*, as is the case also in Welsh.

v is interchangeable with *b* and *m*: see these letters. It is also interchangeable with *f*, and hence the confusion between the characters, as just observed. The changes with *w*, *gu*, *du*, will be considered under the letter W.

VAALS. [Limburg.]

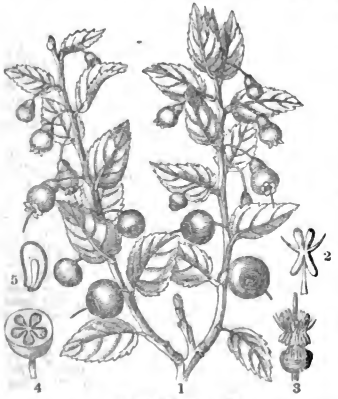
VACA'RIUS, a civilian, who taught the Roman law at Oxford in the reign of Stephen, about the middle of the welfth century. Of the personal history of Vacarius little is known. In the anonymous Norman Chronicle, which mentions him, and briefly notices a work written by him, he is described as 'gente Longobardus, vir honestus et urisperitus, qui leges Romanas anno ab incarnatione Domini 1149 in Angliâ discipulos doceret.' Being a Lombard by birth, it is highly probable that he was brought up at the University of Bologna, which at that time was in high reputation, and it is possible, as far as dates are concerned, that he may have studied in the school of Irnerius. Selden has fallen into an error respecting Vacarius, which has been adopted from him by Heineccius, Duck, Montfaucon, and many other eminent writers. He calls him Rogerius Vacarius, and supposes him and Rogerius, abbot of Bec in Normandy, and also Rogerius Beneventanus, a well-known glossator, to be one and the same individual. Selden, *Diss. ad Fletam*, cap. vii., sec. 3-7.) It has been clearly proved by recent German writers that Selden has in this respect confounded three separate persons, and that the mistake originated in the false punctuation of a passage in the anonymous Norman Chronicle, cited by Selden, in which both Vacarius and Rogerius, abbot of Bec, are mentioned. (Wenck, *Magister Vacarius Primus Juris Romani in Angliâ Professor*, p. 3; Savigny, *Geschichte des Römischen Rechts im Mittelalter*, vol. iv., p. 348.) The time and occasion of Vacarius's appearance in England are related by Gervase of Dover, who is supposed by Selden to have written his Chronicle at the beginning of the thirteenth century. Theobald, archbishop of Canterbury, relying upon the aid and advice of Thomas a Becket, who had himself studied the Roman law at Bologna, appealed to Pope Celestin II. against the king's brother, Henry, bishop of Winchester, who was legate to the apostolical see, contending that, as archbishop of Canterbury, he was *legatus natus*, and entitled of right to the legatine authority. This appeal occasioned great litigation. 'Oriuntur hinc inde,' says Gervase of Dover, 'discordiæ graves, lites et appellationes antea inauditæ. Tunc leges et causidici in Angliam primo vocati sunt, quorum primus erat Magister Vacarius. Hic in Oxonefordiâ legem docuit,' &c. (Twysden, *Hist. Angl. Scriptores*, vol. ii., p. 1665.) As Celestin II. died in September, 1143, within six months after his election to the papacy, and as Pope Eugenius III. disposed of the subject of the above appeal in 1146 in favour of Archbishop Theobald, the period of the introduction of Vacarius and the Roman laws and lawyers into England, as noticed by Gervase of Dover, must have been between the years 1143 and 1146. In the Chronicle of Robertus de Monte (of which the above-cited Norman Chronicle appears clearly to be merely an imperfect abstract) it is expressly stated that Vacarius continued to teach the Roman law in England in 1149, and that 'many, both rich and poor, resorted to him for instruction.' The same authority goes on to say that, 'at the suggestion of the poorer students, Vacarius composed nine books from the Code and Digests, which, for any person perfectly acquainted with them, were sufficient to decide all disputed points of law which usually came to be discussed in the schools.' (Savigny, *Geschichte*, &c.) This latter expression no doubt refers to the controversies on supposed propositions of law, which we know prevailed as juridical exercises in the universities during the middle ages, and which were probably derived immediately from the scholastic disputations, though the general notion of them might possibly have been handed down by tradition from the schools of rhetoricians at Rome. The only other mention of Vacarius to be found in the meagre histories of those times is by John of Salisbury, in the book entitled 'Policraticum, sive de Nugis Curialium,' which is supposed to have been written about the year 1159. This writer, after inveighing against kings who assumed to command the church and interfere with ecclesiastical matters, says, 'I have seen some who have thrown the books of law into the fire, and have not scrupled to cut the laws (*jura*) and canons to pieces if they fell into their hands. In the time of King Stephen the Roman laws, which the house of the venerable Father Theobald, primate of Britain, had brought into England, were ordered out of the realm. Every man was forbidden by a royal edict to retain the books of that law, and our Vacarius was enjoined to silence. Nevertheless, by the help of God, the virtue of that law more prevailed in proportion as impiety sought to weaken it.' (*Policrat.*, lib. viii., c. 22.)

A notice of Vacarius is chiefly important as connected with the introduction of the Roman law into England at this early period, and the great attention which it seems to have attracted. From the passages above cited from contemporary writers, it is clear that a foreign professor taught the civil law at Oxford in the reign of Stephen,—that his teaching was attended by great numbers of rich and poor students,—that for the use of the latter he composed a work consisting of an abstract of the Code and Digest,—that the effect of his teaching was sufficiently important to call for its suppression by a royal edict,—and that, notwithstanding that edict, the study of the Roman law continued to flourish exceedingly. With the slender information we possess respecting the history of this period, it is not easy to ascertain with precision either the motives which induced this zealous and persevering attention to a foreign system of jurisprudence, or the practical uses to which the knowledge of it was applied. No doubt the judges, delegates, advocates, and procurators in the episcopal consistories must have been civilians; but the number of those who for this purpose required an acquaintance with the Roman law could not have been sufficiently great to have constituted so large and flourishing a school as that of Vacarius at Oxford. The fact may perhaps be ascribed to a more general cause. We know that the extraordinary impulse which had then recently been given to the study of the Roman law at Bologna had been communicated to the Continental universities of Europe, and that in all of them the juridical disputations in the schools were pursued by great numbers without any practical object, though with a degree of interest, and even enthusiasm, which it is difficult for us to understand at the present day, but which may in great measure be accounted for by the paucity of other objects of polite learning in those ages. This feeling was probably imported into England, and operated in the same manner at Oxford as in foreign universities. That the civil law was not used as an authority in the English common law courts is evident from the records of the Curia Regis which are in existence from the time of Stephen, and which demonstrate that the law of the land was the antient customary law. Nevertheless the extent to which the Roman law was studied and understood, and the manner in which it was employed by writers in illustrating the common law and supplying its deficiencies, are exemplified in the treatise of Glanville, and still more remarkably in those of Bracton and Fleta. And indeed Vacarius himself, who wrote in England and for English pupils, seems, in an obscure passage of his work, to indicate the mode in which these writers subsequently made use of the Roman law:

'Quid prohibet pauca veluti in collem aliquem, eis maximè, qui legibus istis non utuntur, cumulare, ut infra septa justitiæ quasi ex loco eminenti conspiciendo, discant sine magno labore accedere ad optata.' (Wenck's *Magister Vacarius*, p. 87.)

Several copies of Vacarius's work are still extant in manuscript. The cathedral library at Prague contains a copy which Savigny says he has seen, and of which Professor Wenck gives an account. Another copy is in the town library at Bruges; a third is in the library at Königsberg; and a fourth is the property of Professor Wenck at Leipzig, and is particularly described in his work respecting Vacarius. The book probably exists in other collections, and one would expect to find it at Oxford; but as yet no other copies have been discovered. The original title appears to have been as follows:—'Liber ex universo enucleato jure exceptus, et pauperibus præsertim destinatus.' The whole work consists of nine books, as stated in the Chronicles. These books correspond as to their general subjects with the first nine books of the Code, but the subdivisions are different, some of the titles being taken from the Digest or from other books of the Code. The words of the Code and the Digest are retained as the substance or text of these titles, and a copious gloss accompanies it, composed partly of passages taken from other sources of Roman law and partly of the explanations and illustrations of the author. The work has little value at the present day, except as the only remaining trace of an English school of Roman law at the early period at which it was written. It is described by Savigny in his history; and Professor Wenck has published a very copious abstract of it in his 'Magister Vacarius.'

VACCINA'CEÆ, a natural order of plants belonging to Lindley's polycarpous group of Monopetalous Exogens. The species of this order are shrubby plants, with round irregularly angled stems and branches; simple, entire, alternate, coriaceous leaves, with a solitary or racemose inflorescence. The calyx is superior and entire, or with 4, 5, or 6 lobes, sometimes deciduous. The corolla is monopetalous, and its lobes correspond to those of the calyx and are alternate with them. The stamens are free and are generally double the number of the lobes of the calyx, and are inserted into an epigynous disk; the anthers are terminal, 2-celled, bursting by pores, and furnished with two horns. The ovary is inferior, surmounted by the epigynous disk, 4 or 5 celled, with one or many seeds in each cell; the style and stigma are both simple. The seeds are very small, with a straight embryo in the midst of a fleshy albumen; the cotyledons are very short, and the radicle is long. This order is made by many botanists a section of Ericaceæ. It was separated by De Candolle, and he is followed by Lindley and others. It differs from Ericaceæ in possessing an inferior ovary and a succulent fruit. It was placed by Richard in Escalloniaceæ, but it differs from this order in being monopetalous, and its anthers bursting by pores.



Vaccinium Myrtillus.

1, Branch with fruit; 2, stamen showing horned and porous anthers; 3, stamens seated on disk; 4, section of fruit; 5, seed with embryo.

The plants of this order are not common in Europe, but they are abundant in North America, extending to very high northern latitudes, and are not uncommon on high land in the Sandwich Islands.

The properties of this order closely resemble those of Ericaceæ. The bark and leaves of many of the species possess astringent properties, and are slightly tonic and stimulating. The fruit of many of the species possesses acid and saccharine properties, and are used as articles of diet under the names of Cranberry [Cranberry], Bilberry, and Whortleberry. [Vaccinium.] Many of the species are elegant garden shrubs, as those belonging to the genus *Gaylussacia*. The species of this genus are evergreen or deciduous shrubs, with scattered coriaceous leaves and terminated by a mucrone or gland. The flowers are composed of a 5-cleft calyx and tubular corolla, ventricose at the base and of a scarlet colour, and are arranged in axillary racemes. There are above twenty species belonging to the genus: they are all of them natives of South America, chiefly in Brazil and Peru. This genus was named after Gay-Lussac, a celebrated French chemist and physicist, and a member of the Academy of Sciences. In cultivating the species they require a soil of peat and sand. They may be propagated by cuttings, which will root freely under a hand-glass with a moderate heat. *Thibaudia*, named after M. Thiebaut de Berneaud, secretary of the Linnæan Society of Paris, is a Peruvian genus, yielding a number of elegant shrubs. They have evergreen, coriaceous, quite entire, and nerved leaves, with drooping bracteate flowers arranged in lateral corymbose racemes. The flowers of one of the species, *Thibaudia Quereme*, have a very sweet scent, which is easily communicable to water or spirit, and may be made use of as a perfume or stimulant. In cultivation they require the same treatment as the species of Gay-Lussacia. The Pyrolaceæ are allied to this order. [Winter-green.]

VACCINATION. [Jenner; Small Pox.]

VACCI'NIUM, a genus of plants, the type of the natural order Vaccinaceæ. This genus consists of shrubby plants with alternate membraneous leaves, often beset with resinous dots, and are either permanent or deciduous. The flowers are seated on pedicels, and are either solitary or arranged in simple racemes, generally drooping, without any odour, and tinted with various shades of red or pink. The calyx is 4-5-toothed; the corolla urceolate or campanulate, more or less deeply 4-5-cleft, with the limb reflexed; the stamens are 8 or 10, not attached to the corolla, with 2-horned anthers dehiscing at the summits, and sometimes furnished at the back with two spreading spurs or bristles; the style is longer than the stamens and the stigma obtuse; the fruit is a berry, globose, depressed at the top, 4 or 5-celled, many seeded, of a black purple, bluish or red colour, generally eatable, though not always pleasant or wholesome in an uncooked state. The genus consists of about 50 species, which are known by the common names of Bilberries, Whortleberries, Bleaberries, &c.

V. Myrtillus, the Common Bilberry or Bleaberry, has solitary pedicels, 1-flowered, the leaves are serrated, ovate, smooth, the stem is acutely angular, and the calyx hardly divided. It is a small shrub about a foot high, and is a native of heaths, stony moors, and mountain-woods throughout Europe. It is abundant in Great Britain, especially in the north, and in hilly districts of the south. The blossoms of this plant are elegant as well as its fruit. It flowers in May, and its berries are ripe in the autumn. In the north of England and Scotland the berries are gathered and used for making tarts; in Devonshire and in Poland they are eaten with clotted cream. Children are very fond of them, and they make a wholesome diet. They may be eaten with milk or preserves, and made into tarts. Goats are fond of the leaves, but sheep, horses, and cows refuse them. Moor-game feed upon the berries. The fruit is both acid and astringent, and in the north it is a popular remedy in diarrhœa, dysentery, &c. In the Highlands they are made into a jelly, which is commonly mixed with whiskey to form toddy. It is supposed to be used to cover the smoky flavour of whiskey. The juice of the berries is used for staining paper and linen purple.

V. uliginosum, Great Bilberry, or Bog Whortleberry, as 1-flowered peduncles, with obovate, entire, veined, and eciduous leaves, with rounded stems. Like the last it is small shrub, and attains a height of two feet. It is a nave of Great Britain, and is found in mountainous bogs in umberland and Westmoreland, but is more frequent in e Highlands of Scotland, being found nearly on the sumits of the highest mountains. Its berries are very similar those of the common whortleberry, but their flavour is ot so agreeable. It is a native of Iceland, and the inhatants gather its leaves, with those of Lycopodium pinum, in order to procure a yellow dye for colouring oollens. The fruit is also said to have narcotic prorties, and is added to beer for the purpose of making it ady. When taken in large quantities both Linnæus and ithering state that it produces giddiness and headache, pecially if the fruit is quite ripe. Withering also states at the berries are used by the vintners in France for the rpose of colouring their wines red.

V. Vitis-idæa, Red Whortleberry, or Cowberry, has terinal racemes of drooping, campanulate flowers, with ergreen obovate leaves, dotted beneath, and their marns slightly revolute, and nearly entire. It is a low stragging shrub, with leaves resembling those of the Box, and le flesh-coloured flowers. It is a native of dry places on aths, mountains, and in woods, throughout Europe. It plentiful in the north of England, Westmoreland, Dershire, and Wales. This plant is the badge of the clan acleod. The berries have a red colour, and possess acid d astringent properties. They are hardly eatable raw, t they are made into pies in Derbyshire, and eaten by e common people. They make an excellent jelly, which eating with venison is said to be much preferable to rrant-jelly. It is also used as a demulcent medicine in lds, sore throats, and irritation of the mouth or fauces. nnæus says that large quantities are sent from West thnia to Stockholm, where they are sold for the purpose pickling. This species, according to Pursh, is an inbitant of North America from Canada to New England; t the American is a much larger and stronger plant than e European. A dwarf variety is cultivated in gardens der the name of *V. buxifolium*, and has been found tive on the Campsie and Arran hills in Scotland.

V. stamineum, the Green-wooded American Whortley, has the flowers arranged in racemes and covered h down; bracts as long as the flowers; the anthers biitate, twice as long as the corolla; elliptical, acute, re glaucous leaves, rather downy beneath. This plant a trunk two feet high, giving out numerous green nches, which are downy while young. The flowers are ite, with ten stamens, and are succeeded by greenish or ite berries, which are called dewberries. It is a native North America from New England to Florida. A iety is found in Mexico. It is a pretty garden shrub, l often cultivated.

V. corymbosum, the Naked Flowering Whortleberry, its flowering branches almost leafless; the racemes corymbose, drooping, and furnished with membranous cts, which are shorter than the flower-stalks; the leaves elliptical, acute, minutely serrated, smooth, with downy s. This plant is one of the largest of the species, attain- a height of seven or eight feet. It is a native of umps and wet woods in North America from Canada to olina and Georgia. Its fruit is insipid. Two or three ieties have been recognised by Aiton and other botanists.

V. frondosum, the Blunt-leaved Whortleberry, or Blue ngles, has its flowers arranged in loose racemes; the cts are obovate, and not half as long as the pedicels, ich bear two smaller bracts; the leaves are obovateong, obtuse, entire, smooth. A native of America from w Jersey to Carolina, in open woods. It is a shrub ut three feet high, and bears small white globular wers, with large blue globular berries, which are eatable.

V. Arctostaphylos, Oriental Bearberry, or Bear's-grape hortleberry, has its flowers in lateral racemes, with all bracts at the base of the pedicels; the leaves are acute, iptical, minutely serrated, and hairy beneath; the staens are as long as the corolla, with hairy filaments; the lyx is slightly 5-lobed. This shrub attains a height of e or six feet, and is a native of the coast of the Black a, where it was originally gathered by Tournefort, who s of opinion that it was the ἀρκτοστάφυλος, or Bear's-ape of Galen.,

V. padifolium, the Madeira Whortleberry, or Birdcherry-leaved Bear's-grape, has its flowers arranged in lateral racemes; the bracts all at the base of the pedicels; the leaves ovate-lanceolate, acute, serrated, smooth on both surfaces, except the midrib; the stamens are nearly as long as the bell-shaped corolla, with smooth filaments; and the calyx 5-lobed. This shrub attains a height of from six to ten feet, and is found on the loftiest parts of the island of Madeira, where it forms impenetrable thickets. Pallas describes the berries as black, juicy, eatable, and gratefully acid.

The species of Vaccinium may be propagated by seeds, offset root-suckers, creeping roots, and trailing stems. When the seeds are employed, they should be gathered in the autumn, as soon as the fruit is ripe, and sown in a shady border. When removed, a portion of the earth in which they have grown should be taken with them. When propagated from offsets, &c., they may be at once planted out in the situations where they are intended to remain, and should be placed in soils adapted to their habits. Most of them prefer peat soil or a sandy loam. They differ much in requiring moist or dry situations. Many of the species are admitted into gardens for ornament, and sometimes they are grown for the sake of their fruit. Some of the species require cultivation in the stove and greenhouse: they will strike readily by cuttings under a bell-glass.

(Don's Miller; *Cyclopæd. of Plants*; Hooker's *Brit. Flora.*)

VA'CUUM, or VOID, the name given in physics to the idea of space wholly free of matter, or perfectly empty. In the common phrase, space is called empty when, so far as air can fill space, it is full of air; and even in a more scientific form of speech, there is said to be a vacuum when there is only such an approach to a vacuum as the operations of philosophy can procure. Thus in the *vacuum* of the air-pump, however long the attempt at exhaustion may be continued, there is always air left, though in a highly attenuated state; and even in the mercurial vacuum, or in the space which is left over the mercury of the barometer, there is not unfrequently a slight portion of air, and always an atmosphere of the vapour of mercury. Physically speaking, it is perhaps impossible to procure a vacuum: it is most likely that, even if a real vacuum could be procured for an instant, air or other vapour would at once begin to be disseminated from the sides of the vessel in which the vacuum was made and that the vacuum would thus instantly cease to exist.

But the question of the existence of vacuum, in its strict and absolute sense, and as to whether such a thing were possible or not, was a subject of controversy from before Aristotle to after Newton. It was meant, like other questions of physics, to receive its solution from the exercise of the intellect employing itself upon the apparent properties of material bodies. Aristotle and others denied the actual existence of a vacuum, from a want of exact knowledge of the laws of motion. In a vacuum, says Aristotle (*Physic.*, l. iv., c. 8), there would be no reason why motion should be to one part rather than another. He apparently attributes all motion to the pressure of adjacent matter, not only in its commencement, but in its continuance. A modern philosopher would say that, even if the creation of a vacuum destroyed the cause of gravitation, still a body falling downwards into a vacuum would move through it with the velocity which it had at its entrance. Democritus, Epicurus, and others, assert the existence of a vacuum; and most of the different sects among the Greeks seem to admit the possibility of such a thing, though some of them deny its actual existence.

Descartes denied the very possibility of a vacuum, and upon such grounds as will make most persons feel that if Newton had not come, it would have been better to have kept to Aristotle. There is in his writings an absolute and palpable confusion between *space* and *matter*, to the extent of an assertion that the destruction of all the matter in a certain space would be the destruction of the space itself. He places the essence of matter in the occupation of space, and thence infers by a wrong conversion that there cannot be space without substance (by which he means matter). As follows:—'Vacuum autem philosophico more sumptum, hoc est, in quo nulla plane sit *substantia*, dari non posse manifestum est ex eo quod extensio spatii vel loci externi, non differat ab extensione *corporis*. Nam cum ex eo solo quod corpus sit extensum, rectè concludamus illud esse substantiam; quia omnino repugnat ut nihili sit aliqua extensio; idem etiam de spatio quod vacuum sup-

ponitur, est concludendum: quod nempè cùm in eo sit extensio, necessariò etiam in eo sit substantia.' (*Principia Philosophiæ*, part ii., § 16.) 'So that,' he proceeds (§ 18), 'if God were to destroy all the matter (corpus) in a certain vessel, and to permit no other to come into the *place* of it (locum ablati), the sides of the vessel would be contiguous; *for* when nothing (nihil) comes between two bodies, they must touch each other.' Matter and space are both things; but Descartes falls into the extraordinary confusion of ideas which is implied in first adopting the common sense of the word nothing, as when we say a vacuum is full of nothing, and then arguing from the strict meaning of the word 'nothing,' and denying that 'nothing' can have extension. It is not true, properly speaking, that there is 'nothing' in a vacuum, for the very notion of a vacuum is *space* void of matter.

The idea of Descartes on the essence of matter was carried by his followers to the full extent of using matter as a synonyme for extension. Le Grand says that a vessel filled with gold has not more matter than one filled with water. There is more weight, he says, more hardness, &c., but not therefore more matter; for the essence of matter is not in weight, nor in hardness, &c., but in extension. And he objects to the adage that 'Nature abhors a vacuum,' because he considers such an assertion merely to amount to saying that Nature abhors a contradiction in terms. Newton (*Principia*, book iii., prop. 6. cor. 4) expresses his opinion of the vacuum question in this way:—'If all the solid particles of bodies are of the same density, so that rarefaction cannot take place without the creation of pores, there must be a vacuum.' Since matter is of different density in different substances, and since the same substance may be compressed into smaller space or expanded into larger, it must either be that the solid particles are contracted or expanded, or that vacuous pores exist. This alternative does not do much. A person trained in the sciences as they now exist, thinks the idea of *solid* matter (that is, entirely solid, without any vacuum) being compressed into more solid matter, to be most incongruous and improbable; but impressions derived from habits are not arguments. The strong part of the Newtonian argument arises however from the results of the planetary theory. These celestial bodies have moved, during two thousand years of recorded observations, with exactly the same mean motions as at present, which they could not have done if they had moved in a medium of any sensible resistance. If then the celestial spaces be full of matter, it is matter of such a degree of tenuity that two thousand years is not enough to make it show any visible effect in altering the planetary motions. But again, though this argument has, almost up to the present time, induced astronomers to suspect an absolute vacuum, yet very recently the feather has shown a resistance which was not manifest against the guinea. A COMET has been strongly suspected—all but proved—to be undergoing precisely the same sort of changes in its mean motion which it is known would result from a resisting medium. The undulatory theory of light, moreover, which is now pretty generally received, supposes the whole of the celestial spaces to be filled with the luminiferous æther. The astronomical argument, therefore, in favour of *absolute* vacuum has fallen; but the views of the constitution of matter which have grown with the rise of the molecular sciences of chemistry, light, heat, electricity, &c., have supplied its place with much more effect. We cannot enter into the various probabilities in favour of the molecular theory, which supposes matter to be atomic, the atoms being perhaps separated by distances which are many times their own diameters. If any one were to assert that the densest substance has in it many millions of times more of vacuity than of solid matter, the assertion could not be disproved, nor even shown to be improbable. 'There are difficulties,' said Dr. Johnson, 'about a *plenum*, and there are difficulties about a *vacuum*, but one of them must be true;' that is, either all space is full of matter, or there are parts of space which have no matter. The alternative is undeniable, and the inference to which the modern philosophy would give the greatest probability is, that all space is *full* of matter in the common sense of the word, but really occupied by particles of matter with vacuous interstices; showing all degrees of density, from that of the æther of light, which is wholly unappreciable, to that of hammered platinum, which is twenty-two times as heavy as water.

Probably the manner in which the reader is most familiar with the use of our leading word is in connexion with what he may have seen written on the maxim which we have already quoted—'Nature abhors a vacuum;' a doctrine which, though common among the followers of Aristotle, must not, any more than many others, be therefore taken as emanating from that philosopher himself. This is usually cited as a proof of the puerility of the antient and middle philosophy—we think, somewhat unjustly. The personification of Nature is common to all times, and we are in the habit of saying that Nature exhibits phenomena, conceals her operations, uses the simplest means, &c. Now Nature may as well abhor, as exhibit, conceal, or employ; and where intelligence is understood, all who use the word Nature mean the God of Nature: while when the mere operations are referred to, Nature is only the personification of the collective body of second causes. As the statement of a fact, it is *true:* Nature *does*, to the best of our knowledge, abhor a vacuum; *she* (if we may personify her) never suffers it to exist to the extent of allowing any space which is perceptible to our senses to be vacuous. But if the adage were meant to supply a reason for the fact, those who used it were deceiving themselves, but not so that the most of those who would laugh at them would have any reason in their mirth. It is the error of every period to use words expressive of a fact observed in the sense of assignment of a reason for that fact; and the centuries which have always been ready with their *fluids* to stand for the causes of heat, electricity, magnetism, &c., should not be too hard upon the preceding ages, which put the feelings of nature in the place which they rather prefer to occupy by hypothetical gases. The very word ATTRACTION, in the sense generally assigned to it, is precisely of the same nature as the natural *abhorrence* of the Aristotelians: namely, a word invented to supply the place of a cause. Those who can use the former word in a really philosophical sense are precisely those who can see that some of the antients may have done the same with the latter.

VADDER, LOUIS DE, a celebrated Flemish landscape painter, born at Brussels in 1560. He excelled in representing the misty atmosphere of his country, especially sunrise scenes: his foliage also was managed with great skill and truth, and he was very successful in representing reflections in water, which he painted with remarkable transparency. He etched some spirited plates after his own designs. He died in Brussels in 1623. Vadder was the master of Lucas Achtschelling, who was also a celebrated landscape painter. (Houbraken; Descamps.)

VAGA, PERINO DEL, or *Pierino Buonaccorsi*, a celebrated Italian painter, was born at Florence in 1500. He lost his parents when very young, and was brought up in extreme poverty, but he found a useful protector in the painter Andrea de' Ceri, who took him into his house and gave him employment. He worked afterwards for Ridolfo Ghirlandaio, and finally with a Florentine painter of the name of Vaga, who took him to Rome and recommended him to the notice of Giulio Romano and Penni, whence he acquired his name of Pierino del Vaga. Giulio Romano spoke favourably of Pierino's ability to Raphael, who appointed him to assist Giovanni da Udine in the arabesques and stucco-work of the loggie of the Vatican. He assisted also Polidoro da Caravaggio in his chiaroscuri, and exhibited so much ability that he became a great favourite with Raphael, who intrusted him with the execution of some of his designs in fresco, and they are amongst the best painted in the loggie. Pierino painted the Taking of Jericho, the Passage of the Jordan, the Offering of Abraham, Jacob and the Angel, Joseph and his Brethren, and many others. Del Vaga, with the exception of Giulio Romano and Penni, surpassed all the assistants of Raphael. He was a great draughtsman and executed with rapidity. Vasari considered him the best designer among the Florentines after Michel Angelo, and the most able of the scholars of Raphael. His design resembled more that of Michel Angelo than that of Raphael, but he coloured much in the style of Raphael. He painted many works in Rome: the best is generally considered the Creation of Eve in the church of San Marcello. There are numerous works by him also in various cities of Italy, in Tivoli, in Florence, in Lucca, in Pisa, and in Genoa, where he painted his greatest works, and held the same position that Giulio Romano held at Mantua; they were respec vely the founders of the schools of Genoa and of Mantua. Del Vaga left Rome at the sack of that place in 1527, when he lost all his property, and repaired to Genoa, where Prince Doria took him immediately into his service, and employed him to superintend the decoration of his new palace. The great works executed by Vaga in this palace were amongst the finest paintings in Italy, but most of them are now destroyed. The subjects were chiefly from Roman history and the Heathen mythology. On the ceiling of the great hall he painted in oil the Shipwreck of Æneas and his comrades, but it has since been whitewashed. On the ceiling of a neighbouring apartment he painted in fresco Jupiter destroying the Giants; a work, which alone, says Soprani, is sufficient to immortalize its author, and to render the palace valuable.

Vaga returned to Rome after staying some years at Genoa, and was much employed by Pope Paul III., who granted him a pension for life of twenty-five ducats per month. Shortly before his death his reputation was so great in Rome that nearly all the great works in painting were executed under his direction or from his designs, and he was so much occupied that he made only the cartoons of his works, the painting of them being intrusted to his scholars and assistants, who were very numerous. By incessant application, combined with intemperate habits, he hastened his death; he died in 1547, in his forty-seventh year, and was buried in the Rotonda, where Raphael and other great painters were buried.

His principal scholars were Luzio Romano, Marcello Venusti, Girolamo da Sermoneta, and the Spaniard Luis de Vargas. Caraglio, Bonasone, Hollar, and others have engraved after his works.

(Vasari, *Vite de' Pittori*, &c.; Soprani, *Vite de' Pittori*, &c.)

VAGABOND. [VAGRANT.]

VAGI'NULUS. [LIMAX, vol. xiii., pp. 485, 486.]

VAGINULI'NA, a genus of FORAMINIFERA, to which belongs the *Nautilus legumen*, Linn.

VAGRANT. This term, which in its etymological meaning simply denotes 'a wandering person,' is obviously derived from the Latin *vago*. It was probably introduced into our law language from the Norman French; the phrase '*vagerantz de lieu en lieu currantz per paiis*' occurring in our early statutes in the sense in which the word 'vagrant' is used in common language at the present day. (Stat. 7 Ric. II., c. 5.) The persons to whom it is applied in antient documents are usually classed with 'faitours' (a word of doubtful origin, but meaning an idle liver or slothful person: Cowell's *Interpreter*; Kelham's *Dictionary*), 'travelyng-men,' and 'vagabonds.' The latter expression, 'vagabundus,' was known throughout Europe in connection with feudal law, and is interpreted to mean 'crebro vagans, cui nec certum domicilium, nec constans habitatio est.' (Calvini *Lexic. Jurid.*) It was used in this sense in English law as early as the reign of Henry II. (Cowell's *Interpreter*.) Modern laws have however given to the word 'vagrant' a much more extended meaning, in the application of which the notion of wandering is entirely lost.

In the course of the transition made by the lower classes of society from the condition of feudal villeins to that of free labourers, vagrancy and mendicity necessarily ensued from the unsettled state of the poor; and in most countries where feuds had prevailed, severe laws were made to repress the evils which sprung from this source. In England various statutes and ordinances passed from time to time to obviate the inconveniences arising from wandering mendicancy. The earliest of these was a statute of ordinance, made in the 23rd year of Edward III. (1349), commonly called the Statute of Labourers, which, after reciting that 'many sturdy beggars (validi mendicantes) were enabled by the gains of begging to live, and to devote themselves to pleasures and sins, and sometimes to thefts and other crimes,' forbade 'all persons, on pain of imprisonment, to give anything under colour of piety or charity to such as were able to labour.' In 1366 there is a petition of the Commons complaining of wandering artificers and servants becoming beggars in order to support an idle life, and praying that it might be forbidden under a penalty for any one to give alms or sustenance to any such idle beggars; and that they should be apprehended and put in the stocks or sent to gaol until they found surety for their return to their own country. (*Rolls of Parliament*, vol. i., p. 340.) The answer to this petition does not appear: but a few years afterwards a statute was passed making it (almost in the language of the petition) penal for artificers, servants in husbandry, and others, without a special licence, to quit the town, hundred, or wapentake in which they lived, to live and work in another town, hundred, or wapentake; and persons found vagrant (*vagarant*) without such licence might be placed in the stocks and imprisoned by the local authorities, until they found security for their return to the place to which they properly belonged. (Stat. 12 Ric. II., c. 3.) It was also enacted that 'those who were able to work and went begging should be dealt with as persons travelling without a licence, and that beggars unable to work, dwelling in cities or towns, should remain in such cities or towns; that if such cities and towns were unable to support them, they should be taken to other places within the same hundred or wapentake, or to the place of their birth, and there remain during their lives.' (Stat. 12 Ric. II., c. 7.) And it was probably upon the principle declared by these laws, that in the fifteenth century it was held to be lawful for any person to arrest and send to gaol a man 'found wandering (*vagarant*) in such manner that it is unknown how he gets his living.' (*Year Book*, 9 Edw. IV., 27.) A statute which was passed in 1494 declared that all 'vagabonds, idle and suspected persons, should be set in the stocks three days and three nights, and have none other sustenance but bread and water, and then should be put out of the town; and that whosoever should give such idle persons more should forfeit 12 pence; and that every beggar not able to work should resort to the hundred where he last dwelt, was best known, or was born, and there remain, upon the pain aforesaid.' (Stat. 11 Hen. VII., c. 2.) This vague enactment was followed by the more definite provisions of the Stat. 19 Hen. VII., c. 12, which declared that impotent beggars should go to and abide in the city, town, or hundred where they were born, or else the place where they had made their last abode for three years; and this rule of settlement was adopted in the statutes subsequently passed against vagrancy in the reigns of Henry VIII., Edward VI., Mary, and Elizabeth. (Nolan's *Poor Law*, chap. xv.) By Stat. 22 Hen. VIII., c. 12, the justices of the peace in every county were empowered to grant licences under seal to 'poor, aged, and impotent persons,' to beg within a certain precinct; and persons begging without licence or out of their precincts were to be whipped or set in the stocks for three days and three nights, with bread and water only. This provision applied to impotent vagrants. On the other hand it was provided that if any person, 'being whole and mighty in body,' and able to labour, should be found begging or vagrant, he should be taken before a magistrate, who might direct him to be whipped out of the place at the end of a cart 'till his body was bloody,' and should then be sworn to return to the place where he was born, or last dwelt by the space of three years, and there to put himself to labour as a true man ought to do. He was to be provided with a certificate of his punishment, stating the place to which he was going and the time allotted for his journey; and during that time he might beg by the way. Another law passed against beggars and vagabonds was the 27 Hen. VIII., c. 25, which, though severe in its terms against such persons, approached more nearly to just principles than previous enactments on the same subject, inasmuch as it provided a legal mode of supporting the poor, and thus took away the common apology for vagrancy. This law directed the governors of shires, cities, towns, hamlets, and parishes, to find and keep every aged, poor, and impotent person, by way of voluntary and charitable alms, with such convenient alms, that none of them should be compelled to go openly in begging: children under fourteen years of age and above five, taken begging, were to be put to work: 'a valiant beggar or sturdy vagabond' was to be, for the first offence, whipped and sent to his place of settlement; and if he continued his roguish life, to have the upper part of the gristle of his right ear cut off; and if after that he was taken wandering in idleness, or did not apply to his labour, or was not in service with any master, he was to be indicted and tried as a felon, and if found guilty, to suffer death.

Notwithstanding the above laws, vagrancy appears to have greatly increased at the commencement of the reign of Edward VI., of which effect the abolition of monasteries was one main cause. Previously to the Reformation churches were bound by law to contribute a portion of their income to the living and sustenance of the poor (Stat. 15 Ric. II., c. 6), and the gates of the religious houses were thronged by beggars, who daily received a donation of food, and sometimes of money. This practice contributed no doubt to increase the number of idle beggars, who, upon the withdrawal of their accustomed means of support by the dissolution of the monasteries, became vagrants. To remove the pressure of the evil thus occasioned, an enactment of unexampled severity was devised. The Stat. 1 & 2 Edw. VI., c. 3, after reciting that 'the multitude of people given to vagabondrie and idleness had always been within this realm very great, and more in number than in other regions,' and that the laws of preceding reigns had been found ineffectual, repealed all statutes previously made for the punishment of vagabonds and sturdy beggars. It then enacted that all able-bodied persons, without property sufficient for their support, who should, 'either like serving men wanting masters, or like beggars, or after any other such sort, be lurking in any house, or loitering or idle-wandering by the highway's side,' or who in towns should not apply themselves to any service or art, and should so continue for three days without offering to labour for meat and drink (if no man otherwise will take them); or who, having been taken to service, should leave their work or run away, should be taken to be vagabonds; and that it should be lawful for any person having offered or given work to any such idle person, and for any other person espying the same, to bring such idle person before two justices, who should immediately cause him to be marked with a hot iron on the breast with the letter V, and adjudge him to such presenter '*to be his slave; to have and to hold the said slave unto him, his executors, or assigns, for the space of two years then next following*, and to order the said slave as followeth (that is to say), to take such slave with him, and only giving him bread and water, or small drink and such refuse of meat as he shall think meet, cause him to work by beating, chaining, or otherwise in such work and labour (how vile soever it be) as he shall put him unto.' The statute also provides that an action of trespass may be maintained for a runaway slave, and that the runaway himself shall, upon his apprehension, be adjudged by two justices to be his master's slave for ever. If he ran away a second time, the slave became a felon, and might be tried and executed as such. This singular enactment further declared that a master might 'let, set forth, sell, bequeath or give' the service and labour of such slaves, upon such condition and for such term of years as he might do with any other of his moveable goods or chattels. 'Some thought,' says Burnet, 'this law against vagabonds was too severe, and contrary to that common liberty of which the English nation has always been very sensible. Yet it could not be denied but extreme diseases required extreme remedies; and perhaps there is no punishment too severe for persons that are in health, and yet prefer a loitering course of life to an honest employment.' (*History of the Reformation*, vol. ii., p. 45.)

The consequence of the absurd severity of this law was that its provisions were not carried into execution; and being found wholly ineffectual, it was repealed by the statute 3 and 4 Edw. VI., c. 16, which also repealed all former laws upon the same subject excepting the 22 Hen. VIII., c. 12. Another statute of the same reign (5 and 6 Edw. VI., c. 2) slightly modified the preceding laws; but the regulation of vagrants and mendicants stood in effect upon the footing of the three last-mentioned statutes until the latter part of the reign of Elizabeth.

About the beginning of the reign of Elizabeth, a description of persons called *rogues* first appear in the general class of vagrants. The derivation of this word is variously given by etymologists. Horne Tooke derives it from a Saxon word signifying 'cloaked,' or covered. (*Diversions of Purley*, vol. ii., p. 227.) Webster takes it from another Saxon word, and Dr. Johnson admits its derivation to be uncertain. Lambard says 'the word is but a late guest in our law; for the ancient statutes call such a one a valiant, strong, or sturdy beggar, or vagabond, and it seemeth to be fetched from the Latin "rogator," an asker or beggar.' (*Eirenarcha*, book iv., chap. 4.) Dalton also says 'a rogue may be so called quia ostiatim rogat.' *Country Justice*, chap. 83.) It is believed that the word does not occur in the English language before the middle of the sixteenth century; and if so, it is probably one of those numerous cant words by which, at that period, vagrants, in counterfelting Egyptians or gipsies, began to designate different classes of their own 'ungracious rabble,' and of which Harrison enumerates twenty-three degrees. (Harrison's *Description of England*, prefixed to Holinshed's *Chronicles*.)

In the course of the reign of Elizabeth the evils of vagrancy increased to an alarming extent; and although the accounts given by historians of the multitude of vagabonds in England are founded upon rude estimates, and are probably somewhat exaggerated, there is undoubted evidence that the numbers and attitude of these persons at that period constituted an evil of dangerous magnitude. Strype relates that in 1569 circular letters were issued by the privy council to the sheriffs of the different counties directing them to search for and apprehend 'all vagabonds and sturdy beggars, *commonly called rogues or Egyptians*;' and he says that on the search through the nation 13,000 'masterless men' were taken up. (Strype's *Annals*, vol. i., part 2, pp. 295, 296, 554.) Harrison, who wrote towards the end of Elizabeth's reign, states that the number of vagrants in England in his time amounted to above 10,000 (*Description of England*); and Strype publishes a paper, written, in 1596, by a justice of the peace of Somersetshire, which affirms that there were 300 or 400 wandering idle people in every county, who met at fairs and markets for purposes of theft and rapine, and who sometimes assembled in troops to the number of 60, and completely overawed the magistrates and constables by their audacious threats. (Strype's *Annals*, vol. iv., p. 405.) The recorder of London, in a letter to Lord Burleigh, written in 1581 (Ellis's *Letters*, vol. ii., p. 283), gives a remarkable account of the prevalence of vagrants in the metropolis at that period. He says, that being informed that the queen, 'in taking of the air in her coach at Islington, had been environed with rogues,' he went abroad himself and took seventy-four rogues, 'whereof some were blind, and yet great usurers and very rich.' A day or two afterwards he says that, in consequence of warrants issued by him, he received 'a shoal of forty rogues, men and women, from Southwark, Lambeth, and Newington,' and after bestowing them in Bridewell, he 'perused' St. Paul's, and took about twenty 'cloked rogues that there used to keep standing.' Notwithstanding this zeal and activity, vagrants still increased in the metropolis, both in numbers and in audacity; and the efforts of the ordinary magistrates having failed to prevent the frequent and dangerous disorders and tumults occasioned by offenders of this description, they were, in 1595, placed under martial law. The instrument appointing a provost-marshal for this purpose authorises that officer 'to repair with a convenient company to all common highways near to the city of London, where he should understand that any vagrant persons did haunt; and calling to his assistance some convenient number of justices and constables, to apprehend all such vagrant and suspected persons, and deliver them to the said justices, to be by them committed and examined of the causes of their wandering.' It then directs him that 'if such persons should be found notoriously culpable in the unlawful manner of life, as incorrigible, and should be so certified to him by the justices, he should by law-martial cause some of them to be executed upon the gallows or gibbet.' (Rymer's *Fœdera*, vol. xvi., p. 279.)

The means of suppressing or diminishing vagrancy and mendicancy were constant subjects of discussion in the parliaments of Elizabeth. With this view, extraordinary means of relief were devised. Voluntary subscriptions of sums of money, varying in amount according to the rank and supposed ability of the contributors, were made in both Houses to relieve 'the great number of poor people pressing in the streets to beg.' (D'Ewes's *Journals*, pp. 462, 463, 488, 503.) Orders were also made that those who preferred private bills in the House of Commons should pay 10*l*. or 5*l*., according to the subjects of their bills, to the relief of the poor, to be distributed as the House should appoint. (D'Ewes's *Journals*, p. 665.) Several statutes were also passed, at one time increasing the punishment for vagrancy, and then repealing it, without any settled principle of legislation. In some of these statutes, however, the notion of a parochial fund for the relief of the poor, and the principle of taxing the parishioners for that purpose, are diinctly recognised. (Stat. 5 Eliz., c. 3; 14 Eliz., c. 5; and 8 Eliz., c. 3.) At length, in 1597, after experience had hown that temporary expedients and ill-directed charity nly increased the amount of vagrancy, and that severe unishments and penalties were wholly ineffectual in preenting it, the House of Commons appointed a committee o whom most of the existing laws relating to the condiion of the poor, as well as certain bills for their amendment, were referred. (D'Ewes's *Journals*, p. 561.) This committee, of which Sir Francis Bacon was member, and which was composed of all the practical men of the House, eems to have perceived and to a certain extent acted upon he principle that, in order to justify severity against vagrancy and mendicity, it was necessary to provide the means of relieving that destitution which was the ready nd plausible excuse for both. They therefore prepared he stat. 39 Eliz., c. 3, which for the first time organized hat machinery for the legal relief of the poor, which was few years afterwards completed and made perpetual by he stat. 43 Eliz., c. 2. The same committee also recommended measures for encouraging the building of 'hospials, or abiding and working houses' for the poor, and for mproving and reforming such as were already in existence, ut had been misapplied or abused. And at the same me they introduced a more rational enactment for the correction and suppression of fraudulent vagrancy than had reviously existed. (Stat. 39 Eliz., c. 4.) 'Many statutes,' ays Sir Edward Coke (2 *Inst.*, 728), 'have been made for he punishment of rogues, vagabonds, and sturdy beggars, ut very few to find them work and to enforce them thereunto.' The statute 39 Eliz., c. 4, supplied this deficiency y providing houses of correction, with stocks and mateals for the employment of the inmates, and by enforcing he use of the means thus placed in the hands of the poor y severe penalties against the idle. The provisions of his statute, with some alterations made by the stat. 1 Jac. , c. 25, continued in force during the whole of the 17th century; and, when repealed by the stat. 12 Ann., stat. 2, 23, still served as the model and foundation for future acts. It declared that the following persons should be eemed rogues, vagabonds, and sturdy beggars:—1, persons calling themselves scholars going about begging; sea-faring men, pretending losses of their ships or goods, oing about begging; 3, idle persons going about the country, either begging or using any subtle craft or unlawful games or plays, or feigning themselves to have nowledge in physiognomy, palmistry, or telling fortunes; . persons that were or uttered themselves to be procurers r collectors for gaols or hospitals; 5, fencers, bear-wards, ommon players of interludes and minstrels wandering broad, other than players of interludes belonging to any aron of the realm, or any other honourable personage of greater degree [THEATRE]; 6, jugglers, tinkers, pedlars and petty chapmen, wandering abroad; 7, wandering persons and common labourers, able in body, using loitering, nd refusing to work for reasonable wages, and having no ther means of maintenance; 8, persons delivered out of aol who begged for their fees, or otherwise travelled beging; 9, persons who wandered abroad begging, pretending losses by fire or otherwise; 10, persons, not being elons (*i.e.*, by a late statute, 5 Eliz., c. 20), wandering and retending themselves to be Egyptians. A person who committed any of the above offences might, by the appointment of any justice, constable, headborough, or tything-man (the headborough or tything-man being assisted herein by the advice of the minister and another of the arish), be openly whipped till he was bloody, and then sent from parish to parish till he came to the parish where e was born: if that was unknown, to the parish where he ast lived for a year; and if that again was unknown, to he parish where he last passed without punishment. He was provided with a testimonial of his punishment, and of he place whereunto he was to go, stating the time limited or that purpose; and if he was found loitering by the way, e might again be whipped. If any rogue appeared to be angerous to the inferior sort of people, or not likely to e reformed (an expression which seems to have led to he phrase 'incorrigible rogues'), two justices might commit him to gaol till the next quarter-sessions, and then he might by the justices there be either banished out of the realm, or adjudged perpetually to the galleys of the realm; nd any banished rogue returning without leave became a elon.

The several judicious measures which were enacted at this period for the relief and employment of the deserving poor, and the punishment of idle and profligate beggars and vagrants, effectually checked for a time the evil, which had only increased in magnitude under the previous inefficient and inconsistent laws. Sir Edward Coke, whose testimony as a contemporary is valuable, says, that 'upon the making of the statute of 39 Elizabeth, and a good space after, whilst justices of peace and other officers were diligent and industrious, there was not a rogue to be seen in any part of England; but when justices and other officers became *tepidi* or *trepidi*, rogues, &c. swarmed again.' (2 *Inst.*, 729.) This disposition on the part of magistrates to neglect or relax the laws relating to vagrants is noticed in a proclamation made soon after the accession of James I., in September, 1603, which, after reciting the stat. 39 Eliz., c. 4, and that great benefit had at first ensued from its due execution, but that, by the remissness, negligence, and connivancy of justices, vagrants again swarmed and abounded everywhere more frequently than in times past, calls upon all justices of peace, mayors, and other officers whatsoever, to see that the said 'profitable and necessary law' should be carefully, duly, and exactly executed. (Rymer's *Fœd.*, vol. xvi., p. 554.) The continued unwillingness of magistrates to enforce the statute of Elizabeth, notwithstanding the above proclamation, occasioned the passing of the stat. 7 Jac. I., c. 5, which compelled the justices of every county under heavy penalties to erect proper houses of correction for setting rogues, vagabonds, and other idle and wandering persons to work, and also required them to meet twice a year or oftener, if occasion required, for the better execution of the law. The justices were also directed to cause a general privy search to be made before each of their meetings for finding out and apprehending vagrants, who were then to be brought before them for punishment; and all constables and tything-men were required to make a return on oath to the justices of the number of vagrants apprehended by them. By this statute it was also enacted that persons running away and leaving their families upon the parish should 'be deemed and taken to be incorrigible rogues, and endure the pain of incorrigible rogues.' This phrase was therefore at that time become familiar, though it does not occur in any earlier statute. In all probability however it denoted the class of persons mentioned in the stat. 39 Eliz., c. 4, who are there called 'dangerous rogues, or rogues not likely to be reformed,' and who were liable to be committed to gaol until the sessions, and then banished.

The laws relating to vagrants continued substantially upon the footing of the statutes of 39 Eliz. and 7 Jac. I. for more than a century, until, in 1744, they were reconsidered and remodelled by the stat. 17 Geo. II., c. 5. This was the first legislative measure which distributed vagrants into the three classes of idle and disorderly persons, rogues and vagabonds, and incorrigible rogues. Although this statute is now wholly repealed, it continued in force nearly a century; and as its provisions, as well as those of two supplemental statutes on the same subject, are material with respect to the general history of the laws respecting vagrants, it may be desirable briefly to state them. It may be remarked that the several offences comprised in these classes still bore the character of wandering, in conformity with the object of all previous enactments upon this subject.

By the stat. 17 Geo. II., c. 5, and the supplemental statutes passed previously to the new Vagrant Act, 5 Geo. IV., c. 83, idle and disorderly persons were defined to be —1, those who threatened to run away and leave their families upon the parish; 2, those who returned to a parish from which they had been removed as paupers; 3, those who refused to work for usual wages; 5, those who neglected work or spent their earnings improperly, so that their families became chargeable to the parish (stat. 32 Geo. III., c. 45, s. 8). And all such persons might be summarily convicted by a magistrate, and committed to hard labour in the house of correction for a month.

Rogues and vagabonds were defined to be—1, those who went about as gatherers of alms under pretence of loss by fire or other casualty, or as collectors for prisons or hospitals; 2, fencers and bear-wards, 3, common players of interludes, and all actors for hire not authorized by law [THEATRE]; 4, minstrels and jugglers; 5, those who pretended to be gipsies, or to have skill in physiognomy, palmistry, or like crafty science, or to tell fortunes, or who used any subtle craft to deceive people, or played at unlawful games; 6, those who ran away and left their families chargeable to the parish; 7, petty chapmen and pedlars wandering abroad without licence; 8, those who wandered abroad and lodged in alehouses, barns, outhouses, or in the open air, not giving a good account of themselves; 9, those who wandered abroad and begged, pretending to be soldiers or sailors, or pretending to go to work in harvest; 10, all wandering beggars; 11, those who should be apprehended having upon them any picklock key, crow, jack, bit, or other implement with intent to break into houses, &c.; or any pistol, hanger, cutlass, bludgeon, or other offensive weapon, with intent feloniously to assault any person; 12, those who should be found in any dwelling-house, warehouse, coach-house, stable, or outhouse, or any inclosed yard or garden, or area belonging to any house, with intent to steal. The two classes last enumerated were added by the stat. 23 Geo. III., c. 88.

Incorrigible rogues were defined by the stat. 17 Geo. II., c. 5, to be—1, end-gatherers offending against the stat. 13 Geo. I., c. 23, for the regulation of the woollen manufacture; 2, those who being apprehended as rogues and vagabonds escape from those who apprehend them, or refuse to go before a magistrate, or to be examined on oath, or to be conveyed by a pass, and those who knowingly give a false account of themselves; 3, those who escape from the house of correction before the expiration of their term of imprisonment as rogues and vagabonds; 4, those who after punishment as rogues and vagabonds again commit offences in the same class.

Rogues and vagabonds and incorrigible rogues were, by the stat. 17 Geo. II., c. 5, to be committed by magistrates to the house of correction until the next quarter-sessions, when the justices were empowered to order rogues and vagabonds to be further confined in the house of correction for any time not exceeding six months; and incorrigible rogues for any time not less than six months, nor more than two years, and to be whipped.

The statute 17 Geo. II., c. 5, was by no means a well-considered or a well-expressed law. It has been justly said that 'in the long catalogue of actions which it holds up, many are of a dubious nature, and nice legal acumen would often be required to distinguish whether a person had incurred any and what penalty under the statute.' (Eden's *State of the Poor*, vol. i., p. 306.) The courts too complained of the inaccuracy of its expression and the consequent difficulty of understanding its meaning. (Rex *v.* Rhodes, 4 *Term Reports*, 222.) Repeated attempts were made in parliament to modify and improve its provisions. A committee of the House of Commons, appointed in 1775 to review and consider the Poor Laws and the laws relating to vagrants, resolved 'that the stat. 17 Geo. II., c. 17, should be explained and amended in such a manner as to enforce the execution thereof, and prevent the practice of begging in the streets and highways, pernicious in its consequences and highly disgraceful to this country.' Nevertheless this statute continued in force until the year 1822, when a temporary act, stat. 3 Geo. IV., c. 40, passed, repealing all former laws and re-enacting most of the provisions of the stat. 17 Geo. II., c. 5, with many additions and modifications. The provisions of the stat. 3 Geo. IV., c. 40, were however entirely superseded by the stat. 5 Geo. IV., c. 83, which now (1843) constitutes the law respecting vagrants. By the third section of this statute the following persons are declared to be idle and disorderly persons, and may be committed by a single magistrate to hard labour in the house of correction for any time not exceeding one month:—1, every person able to maintain himself and his family, refusing or neglecting to do so, whereby he or his family become chargeable to the parish; 2, every person returning and becoming chargeable to a parish from which he has been legally removed by order of two justices without having a certificate of his settlement in some other parish from the officers of such parish; 3, petty chapmen or pedlars wandering abroad and trading without licence; 4, prostitutes wandering in the streets or highways, or in any place of public resort, and behaving riotously or indecently; 5, every person wandering abroad or placing himself in any public place to beg and gather alms, or procuring any child to do so.

The 4th section of the 5 Geo. IV., c. 83, declares the following persons to be rogues and vagabonds, and empowers a single magistrate to commit them to hard labour in the house of correction, for any time not exceeding three months:—1, Every person committing any offence which would constitute him an idle and disorderly person. 2, Every person pretending to tell fortunes, or using any device, by palmistry or otherwise, to deceive and impose upon the people. 3, Every person wandering abroad and lodging in any barn or outhouse, or in any deserted building, or in the open air, or under a tent, or in any cart or waggon, not having any visible means of subsistence, and not giving a good account of himself. 4, Every person wilfully exposing to view in any street, road, highway, or public place, any obscene print, picture, or other indecent exhibition. (By 1 and 2 Vict., c. 38, this provision is declared to extend to exposing such articles in a shop window.) 5, Every person wilfully and obscenely exposing his person in any street or highway, or in the view thereof, with intent to insult any female. 6, Every person wandering abroad and endeavouring by the exposure of wounds or deformities to gather alms. 7, Every person going about as a gatherer or collector of alms, or endeavouring to procure charitable contributions under a false pretence. 8, Every person running away and leaving his wife actually or probably chargeable to the parish. 9, Every person playing or betting in any street, highway, or public place with any table or instrument of gaming, at any game of chance. 10, Every person having in his possession any picklock-key, crow, jack, bit, or other implement, with intent feloniously to break into any house, &c., or being armed with any gun, pistol, hanger, cutlass, bludgeon, or other offensive weapon, or having upon him any instrument with intent to commit any felonious act. 11. Every person, being found in any dwelling-house, warehouse, coach-house, stable or outhouse, or in any inclosed yard, garden, or area for any unlawful purpose. 12. Every suspected person or reputed thief frequenting any river, canal, or navigable stream, dock, basin, or any quay, wharf, or warehouse near or adjoining thereto, or any street, highway, or avenue leading thereto, or any place of public resort, or any avenue leading thereto, or any street, highway, or place adjacent, with intent to commit felony. 13, Every person apprehended as an idle and disorderly person, and violently resisting any peace-officer so apprehending him, and being subsequently convicted of the offence for which he shall have been so apprehended.

The 5th section of the stat. 5 Geo. IV., c. 83, authorizes a single magistrate to commit incorrigible rogues to the house of correction until the next sessions, during which interval they are to be kept to hard labour. The 10th section of the act then authorizes the justices at sessions to continue the imprisonment of this class of offenders with hard labour for any time not exceeding a year, and to order whipping, if they deem it to be expedient. Incorrigible rogues are defined by the statute as follows:—1, Every person breaking or escaping out of any place of legal confinement before the expiration of the term for which he shall have been committed. 2, Every person committing any offence against the act which would subject him to be dealt with as a rogue and vagabond, having been at some former time adjudged so to be and convicted thereof. 3, Every person apprehended as a rogue and vagabond and violently resisting any peace-officer so apprehending him, and being subsequently convicted of the offence for which he shall have been so apprehended.

The statute, besides the definition of the facts and circumstances which are to constitute offences in the several classes above enumerated, contains various provisions for the prosecution of vagrants and the regulation and disposal of them. Thus it is enacted that any person may apprehend a vagrant and bring him before a magistrate. The persons as well as the carriages or luggage of the several descriptions of vagrants may be searched, and money or goods found upon them may on their conviction be applied towards the costs of apprehending them and maintaining them in prison. If proceedings at the sessions are contemplated, either by reason of an appeal against a summary conviction or the commitment of an incorrigible rogue, the committing magistrate may bind over witnesses to prosecute, and the justices at sessions may order the payment of costs to persons so bound. And an appeal is given to the next sessions to any person aggrieved by an act or determination of any magistrate out of sessions concerning the execution of the act.

Although the modern statute constitutes in many respects an improvement of the law, it is liable to some of the objections which were made to the 17 Geo. II., c. 5, and to others of a graver character. It is by no means exclusively a Vagrant Act, though popularly so called; but its provisions extend to various offences not necessarily connected with vagrancy, which the legislature has thought proper to place within the summary jurisdiction of justices of the peace. Under the former statute, a single magisrate was only intrusted with the power of summary commitment for a month in the case of idle and disorderly persons, or to the next sessions in case of rogues and vagabonds and incorrigible rogues. Whereas, under the recent act, a single magistrate has the power of at once commiting rogues and vagabonds to prison with hard labour for hree months. If the offences to be punished had been precisely defined by the statute, this large extent of summary jurisdiction might have been less objectionable; but he language of the law is peculiarly loose and inaccurate. For instance, who are to be considered 'suspected persons,' or 'reputed thieves,' or what is to be taken for an 'unawful purpose,' or 'frequenting a street,' in the true egal construction of this statute, so as to render the persons to whose acts these phrases are applied rogues and agabonds? are often questions of doubt and difficulty to ractical lawyers, and may reasonably occasion hesitation nd difference of opinion even among those to whom the nal interpretation of penal laws belongs. This latitude nd vagueness of expression are peculiarly dangerous in a aw which gives large judicial power to unprofessional persons, who are for the most part withdrawn from the conol of public opinion in the exercise of it; where the ubjects and objects of the law are nearly connected with ocal excitements and prepossessions, and where the arties who suffer from misdecision are commonly the oor and helpless, to whom an appeal is wholly inaccesible.

VA'HEA, a genus of plants of the natural family of Apocynaceæ, so named from *Vahé*, the name of one of he species, V. gummifera, in the island of Madagascar, where it is said to yield an excellent kind of caoutchouc. This species is thought by some to be the same plant as Urceola elastica [URCEOLA], but this is doubtful. One or wo other species are found in Africa, which are said to ield edible fruit.

VAHL, MARTIN, a botanist, was born 10th of October, 749, at Bergen in Norway. Having received his preminary education at Bergen, he was entered a student of he university of Copenhagen in 1766, and resided in the ouse of the Rev. Hans Stroem, a distinguished naturalist. t was here that he imbibed his taste for botany, and aving lived at Copenhagen two years, he left for Upsal, n order that he might study under Linnæus. Here he ecame one of the most distinguished pupils of the great otanist, and remained at Upsal for five years. His interourse however with his preceptor was suddenly interupted by a domestic occurrence, for 'it was scarcely to be xpected,' says Smith, 'that the dignified professor, then n the zenith of his prosperity and honours, could favourbly regard the inclination of one of his daughters for a tudent who had his own fortune to seek; nor is anything ecorded of this daughter which might have justified a omantic attachment or adventurous pursuit on the part of he young man.'

In 1779 Vahl was appointed lecturer at the Botanic arden of Copenhagen, where, having remained three ears, he was appointed by the king of Denmark to underake a scientific tour, during which he visited Holland, rance, Italy, Spain, Barbary, Switzerland, and England. n these various countries he made large collections of lants, and visited their principal museums. Whilst in England he was in constant intercourse with Sir J. Banks nd Sir J. E. Smith, to whose herbaria and libraries he had onstant access, and he availed himself extensively of this rivilege.

On his return to Copenhagen in 1785, he was appointed professor of natural history in the university, and was inrusted with the continuation of the 'Flora Danica,' lready commenced by Œder. This work was completed n twenty-four fasciculi, seven of which were done preious to its having been undertaken by Vahl. He made everal journeys to the coasts and mountains of Norway for the purpose of getting materials for this work, which was completed in 1810. In 1790 he commenced a work entitled 'Symbolæ Botanicæ.' It appeared in three folio fasciculi, each fasciculus containing twenty-five plates. The principal object of this work was to illustrate Forskäl's discoveries; but Vahl gave descriptions and drawings of many plants from his own collections. In 1796 he commenced the publication of his 'Eclogæ Americanæ,' which was a sequel to the 'Symbolæ,' and consisted of three fasciculi containing in all thirty plates.

In 1799 and 1800 the government again paid his expenses in visiting Holland and Paris, for the purpose of examining botanical specimens, to enable him to bring out a great work which he had in contemplation on the whole vegetable kingdom. On returning to Copenhagen from this visit, he was appointed professor of botany in the university. He lived to complete only one volume of his great work entitled 'Enumeratio Plantarum.' This was published in 1804: he died on the 24th of December of the same year. Since his death, five more volumes have been published. His extensive library, consisting of 3000 volumes of books, his herbarium, and manuscripts, were purchased by the king of Denmark for 3000 dollars (about 675*l.*), besides an annual pension of 400 dollars to his widow, and of 100 dollars to each of his six children.

Vahl also paid attention to zoology: he communicated remarks on the carnivora to Cuvier, and also some observations on insects to Fabricius, and assisted in the completion of the 'Zoologia Danica,' a work that had not appeared at his death. He was a learned and zealous botanist, and his works will remain a monument of his accurate acquaintance with a large portion of the vegetable kingdom. *Vahlia*, a genus of Saxifragaceous plants, was named in honour of him by Thunberg.

(*Biographie Universelle;* Sir J. E. Smith, in Rees's *Cyclopædia*.)

VA'HLIA, a genus of plants of the natural order of Saxifrageæ, so named in honour of Martin Vahl, a pupil of Linnæus, afterwards professor of botany at Copenhagen, and author of several botanical works, and one of the editors of the 'Flora Danica.' Though the genus Vahlia belongs to a family of plants indigenous in cold and temperate climates, it is itself found only in hot parts of the world, as Egypt, Senegambia, the Cape of Good Hope, and the peninsula of India. The characters of the genus are—tube of calyx adherent to ovary, limb superior, 5-parted; petals, 5, spreading and undivided; stamens 5, alternating with petals; styles 2; stigmas capitate; capsule 1-celled, 2-valved at the apex, 5-furrowed, crowned by the lobes of the calyx; seeds convex on the outside. The species are small, usually hairy, subdichotomous. Leaves opposite, without stipules, linear or lanceolate; pedicels axillary, twin, single-flowered, with the flowers of a white colour.

VAILLANT, JEAN FOY, was born at Beauvais on the 24th of May, 1632. He lost his father at the age of three, and was educated by an uncle, who wished his nephew to study the law, in order that he might become his successor in some offices which he held. The uncle however, who left all his property to his nephew, died at a time when Vaillant was not yet old enough to become his successor; and being now in the possession of a considerable fortune, he followed his own inclinations, and devoted himself to the study of medicine, of which he was made doctor at the age of twenty-four. Vaillant's name has become celebrated, not for what he did in his profession, but for what he did for numismatics: he is one of the first men who showed the importance of antient coins for history. The circumstance which led him to the pursuit of these studies is related as follows:—A farmer in the neighbourhood of Beauvais, while working in his fields, discovered a great quantity of antient coins, and not knowing what to do with them, he took them to Vaillant, and consulted him about the use that could be made of the coins. Vaillant looked at them at first very cursorily, but on further thoughts his curiosity became excited, and he began examining them carefully. The discoveries which he made afforded him so much pleasure, that henceforth he devoted nearly all his time to the study of this branch of antiquity. Some years after this occurrence he had occasion to go to Paris, where he became acquainted with Pierre Seguin, who had a fine collection of antient coins, and was very fond of the study. Vaillant visited him frequently, and made also the acquaintance of several other eminent men, who soon perceived that he possessed extraordinary talent and more than an ordinary knowledge of antient medals, until at length he also attracted the attention of Colbert. This minister was then about removing the numismatic cabinet of Gaston de Bourbon to Versailles, and he wished to increase it. He therefore commissioned Vaillant to travel through Italy, Sicily, and Greece for the purpose of collecting antient medals for the king's cabinet. Vaillant spent two years on this journey, and collected a great quantity of beautiful and rare coins, which made the cabinet of Versailles one of the most splendid collections of medals in Europe. In the year 1674 Vaillant published his first work, on the coins of the Roman emperors, under the title 'Numismata Imperatorum Romanorum praestantiora, à Julio Cæsare ad Postumum et Tyrannos,' of which a second and much improved edition appeared in 1692, 2 vols. 4to. The last and best edition is that of Baldinus, Rome, 1743, 3 vols. 4to. In the same year in which Vaillant published his first work, he was sent out a second time by Colbert, in search after antient coins. He embarked at Marseille for Rome, but on the second day after leaving the port the French vessel was captured by an Algerine corsair, and all persons on board were taken to Algiers as slaves. Vaillant was kept in slavery for upwards of four months, until, after some energetic remonstrances on the part of the French government, he was restored to freedom. After having recovered a number of gold coins which the Algerines had taken from him, he embarked for Marseille. On the second day of the voyage the vessel was again pursued by a corsair, and when Vaillaint saw that the danger became threatening, he resolved to secure at least his gold medals, and he swallowed them. However a sudden change of the wind delivered the vessel from the enemy, and after several adventures it was thrown among the sands at the mouth of the Rhône. Vaillant got on shore in a skiff, but suffered very much from the medals till he was relieved of them. Soon after his arrival he was sent out on a third expedition, during which he travelled through Egypt and several parts of Asia. His exertions were richly rewarded; he returned to Paris in 1680, and brought with him a very large collection of coins, which were again incorporated in the king's cabinet, the whole arrangement of which was now intrusted to him. Immediately after his return he was chiefly occupied with studying the coins and the history of the Seleucidae in Syria, and in 1681 he published the results of his labours in his 'Seleucidarum Imperium, seu Historia Regum Syriae ad fidem Numismatum accommodata,' 1 vol. 4to. The remaining years of his life Vaillant spent at Paris, in the uninterrupted study of numismatics and the composition of his works. During this period he also paid a visit to England to see the most valuable collections of medals. In 1702, when Louis XIV. gave a new constitution to the Academy of Inscriptions, Vaillant was made a member, and soon after a pensionary of it. He died on the 23rd of October, 1706.

In estimating the merits of Vaillant, we must bear in mind that he cultivated numismatics at a time when the subject was yet in its infancy, and his labours, if estimated under these circumstances, are highly meritorious. Although most of his works have been superseded by the more recent investigations of Eckhel and Sestini, some are still of great value. Besides those mentioned above, the following works deserve notice:—1, 'Numismata aerea Imperatorum et Cæsarum in Coloniis, Municipiis, et Urbibus jure Latio donatis, ex omni Modulo percussa,' Paris, 1688, 2 vols., fol.; 2, 'Numismata Imperatorum et Cæsarum à Populis Romanae ditionis Graece loquentibus ex omni Modulo percussa,' Paris, 1698, 4to., a second and enlarged edition of this work appeared at Amsterdam, 1700, fol.; 3, 'Historia Ptolemaeorum, Ægypti Regum, ad fidem Numismatum accommodata,' Amsterdam, 1701, fol.; 4, 'Nummi Antiqui Familiarum Romanarum perpetuis Interpretationibus illustrati,' Amsterdam, 1703, 2 vols. fol. After his death there appeared—5, 'Arsacidarum imperium, sive Regum Parthorum Historia ad fidem Numismatum accommodata,' Paris, 1725, 4to.; and 6, 'Achaemenidarum Imperium, sive Regum Ponti, Bosphori, Thraciae, et Bithyniae Historia ad fidem Numismatum accommodata,' Paris, 1725, 4to. The 'Mémoires de l'Académie des Inscriptions et Belles Lettres' also contain several interesting papers by Vaillant.

(Niceron, *Mémoires des Hommes Illustres*, vol. iii.; Chaufepié, *Dictionnaire Historique et Critique*.)

VAILLANT, JEAN FRANÇOIS FOY, a son of the celebrated numismatist, Jean Foy Vaillant, was born at Rome on the 17th of February, 1665, when his father was travelling for the purpose of collecting antient coins. At the age of three years he was brought to Beauvais, and at twelve he was sent to a college of the Jesuits at Paris. His father wished him to follow the medical profession, but at the same time made him familiar with numismatics, and usually took him with him to the royal cabinet of medals during the time that he was engaged in arranging them. Young Vaillant accompanied his father on his visit to England, and after his return to Paris he began seriously to apply himself to the study of medicine, of which he was made a doctor in 1691. His reputation as a numismatist however appears to have been much greater than that as a physician, and in 1702 he was made a member of the Academy of Inscriptions, to the Mémoires of which he contributed several papers on antiquarian and numismatic subjects, which raised great expectations and show that he would perhaps have surpassed his father, had his life been spared longer. He died on the 17th of November, 1708, in consequence of a fall which produced an abscess in his head. The only medical work of Vaillant is a treatise on the virtues of coffee.

(Niceron, *Mémoires des Hommes Illustres*, vol. [illegible]; Chaufepié, *Dictionnaire Historique et Critique*.)

VAILLANT, SEBASTIAN, botanist, was born on the 26th of May, 1669, at Vigny, near Pontoise, being the eldest son of a shopkeeper in that town, At a very early age he acquired a taste for botany, and when only six years old had made a collection of the wild plants of the country, which he cultivated in his father's garden. But his father, fearing that his love of plants would be the ruin of him, directed his attention during his leisure hours to music, and so great was his progress on the organ, that, at the age of eleven, on his tutor dying, he was appointed organist in his place in the Benedictine convent of St. Macloud. He also was distinguished by his attention to his general studies at the grammar-school of Pontoise. He was afterwards appointed resident organist in a nunnery near his native town, and having a strong inclination for the study of medicine, he took every opportunity to visit the sick in a neighbouring public hospital. His progress in anatomical and medical reading having been great, he was appointed assistant-surgeon to the hospital. At the age of nineteen he left this position to pursue his medical studies at Evreux, in Normandy; and having been introduced to the Marquis de Goville, a captain of the royal fusileers, he was appointed by him surgeon to his company, with the rank of lieutenant. In this position he was present at the battle of Fleurus, where his patron having been killed, he left the army and came to Paris in 1691. His intention was still further to pursue medicine, but in the course of his studies he attended the lectures of Tournefort, who was then at the height of his popularity as a botanical teacher. His long-forgotten passion for plants again broke forth, and he resolved to abandon himself entirely to the study of botany. The period was favourable for this determination; the genius of Tournefort had just shed a brilliant light on many of the obscure departments of botany, which served to show how much was yet to be done. Vaillant soon gained the friendship of Tournefort, and was afterwards introduced to M. Fagon, first physician to the king, and professor of botany and subdemonstrator of plants in the Jardin du Roi. Fagon made him his secretary, and appointed him, under himself, a director of the Jardin du Roi, and, in 1708, resigned in his favour his professorship and subdemonstratorship, situations which Tournefort was known to have been anxious to obtain. Soon after his appointment to these positions, many improvements were made in the gardens, and Vaillant was commissioned by the king to form a museum of materia medica. In 1716 he was elected a member of the Academy of Sciences, an honour which he had never sought, and which he at first refused to accept.

As a lecturer Vaillant was successful, and for many years he did little else than publish his views through the medium of his lectures. Although a pupil, an admirer, and a friend of Tournefort, he was opposed to many of his views, and especially the system on which he had arranged the vegetable kingdom; and in 1721 he read before the Academy of Sciences a criticism on the method of Tournefort, which was published in the Memoirs of the Academy for 1723. He did not however succeed in establishing any classification of his own; and it is not probable, even if he had lived to have carried out his own views on systematic botany, that he would have produced a system that could have supplanted the one which was he basis of the 'Institutiones Rei Herbariæ,' and which aid the foundation for the labours of Adanson, the Jussieus, and De Candolle. The most successful portions of his criticisms directed against Tournefort were those with regard to the functions of the stamens and pistils, which Tournefort looked upon as only excretory organs, and held to be of very secondary importance in the structure of the flower. Vaillant published his views on this subject in a paper, entitled 'Sermo de Structura Florum, horum differentia usuque partium eos constituentium,' &c., Leyden, 1718. It was also published at the same time in French. Between the years 1718 and 1722 he read several papers before the Academy of Sciences on the genera and species of the natural order Compositæ, which were very valuable contributions towards the elucidation of the structure of that difficult order of plants. He did not publish remarks on the foreign species of other orders, but Sir J. E. Smith states that the remarks in his Herbarium, preserved at Paris, 'display astonishing instances of his profound knowledge and acute judgment with respect to the genera, pecies, and synonymes of plants.'

Vaillant had evidently during his life been preparing for ome great work, but before he had arranged his materials he was attacked with the symptoms of pulmonary consumption, which obliged him to abandon his design. There was one work however on which he had spent a great deal of time and labour, and which he was anxious to have published, and that was on the plants growing around Paris. Tournefort had, in his 'History of Plants which grow in the Neighbourhood of Paris,' attempted the same thing; but this was admitted to be the least successful of his efforts, and Vaillant obtained for his work the assistance of Aubriet, the first botanical draughtsman of the day, who had made upwards of 300 drawings: the description of all the species were very carefully made, with an accurate account of the synonymes, in which Tournefort's work was ery deficient; and, in addition, he had also examined to ome extent the cryptogamic plants. Finding that he ould not publish this work before his death, he wrote to he celebrated Boerhaave, requesting that he would consent to publish it: a negotiation was carried on between he two by means of our countryman Dr. William Sherard SHERARD], and ended in the consent of Boerhaave to publish the work. Vaillant, having been thus relieved of this last earthly anxiety, prepared composedly for his death, which took place on his birth-day, May 26, 1722.

The posthumous work, entitled 'Botanicon Parisiense,' was published at Leyden in 1727, forming a large folio with 33 plates, containing between 300 and 400 figures of plants. The figures are uncoloured, and the plants are arranged in an alphabetical manner. The definition of the species is in Latin; the rest of the text is in French.

Vaillant was a man of no ordinary talent and integrity. His botanical works display the accuracy and originality of his mind, and it is probable that had not his plans been too gigantic for his enfeebled constitution and the shortness of his life, he would have left behind him more abundant proofs of his genius. He began to tread in the path which was so successfully followed up by Linnæus; and his attempt at improving the nomenclature of botany is an indication of his perception of the necessity of that change which was effected by the subsequent efforts of Linnæus. He was also one of those who, before the time of Linnæus, distinctly taught and upheld the doctrine of the sexuality of plants. He has been sometimes censured for his attacks on Tournefort, but these were directed, not towards the man, for whom he entertained a profound regard, but towards what he deemed his errors. When his friend and patron Fagon was on his death-bed, Vaillant was unremitting in his attentions throughout a painful disease; and when pressed to receive a sinecure under government enjoyed by Fagon as a reward for his attentions, he refused. He left a widow, but no offspring. The genus *Vaillantia* of De Candolle was named in honour of him.

(Bischoff, *Lehrbuch der Botanik*: Haller, *Bib. Bot.*; *Biog. Univ.*; Sir J. E. Smith, in Rees's *Cyclopædia*.)

VAILLANT, FRANÇOIS LE, was born in 1753, at Paramaribo, in Dutch Guiana, where his father, a rich merchant and native of Metz, was French consul. His parents had a taste for collecting objects of natural history. They were also in the habit of making frequent excursions to the less settled parts of the colony, always carrying the boy along with them. Le Vaillant at an early age had thus not only contracted the tastes of his parents and the habits of the backwoodsman, but at the age of ten years had acquired considerable experience in collecting, and arranging after a system of his own, insects and birds.

In 1763 the family of Le Vaillant left Surinam to return to Europe. They landed at the Texel, and after spending some time in Holland proceeded to Metz. Here Le Vaillant found a fresh stimulus to his favourite pursuits in the ornithological cabinet of M. Bécœur. In Surinam he had been accustomed to dry and preserve the skins of birds: he now set himself assiduously to acquire the art of preserving the form and attitude of life by stuffing them. A passionate hunter, he tells us that during a residence of two years in Germany and of seven in Alsatia and Lorraine, he killed an immense number of birds. But he had also a taste for observing their habits, and spent whole days and even nights in watching them. These pursuits were in him the indulgence of a passion. What plan of education his parents adopted, or whether they destined him for any profession, is unknown. The only hint preserved on this subject is an incidental observation in his Travels, that his father insisted upon his acquiring a number of languages. Dutch he spoke fluently—probably learnt in childhood; German and French, it is said, well, though his writings are alleged by critics to want the idiomatic precision of a native.

In 1777 he came to Paris, where the rich collections of birds and the writings and conversation of naturalists at first attracted and then repelled him. He felt and acknowledged the genius of those in whose hands observations such as he had made self-taught after the desultory fashion of an amateur had become a science. He was delighted with the varied wealth of collections from all quarters of the world which were opened to his inspection. But accustomed to pry into the habits and economy of the living bird, the mere cataloguing and classifying of skins and skeletons soon became repulsive to him; and the inaccuracies of mere closet speculators nourished a perhaps overweening estimate of his own more living knowledge. This feeling, his sportsman habits, the pleasant recollections of his boyhood in the forests of Guiana, all contributed to make him dwell with pleasure on the project of ransacking the yet unexplored regions of the earth in order to drag to public view their feathered inhabitants. With this object he quitted Paris, unknown to his friends, in July, 1780. He repaired to Amsterdam, where he formed an intimate acquaintance with Temminck; and after five months spent in preparations, embarked, in December, for the Cape of Good Hope, where he arrived in March, 1781.

Le Vaillant remained in the colony till July, 1784. War had just broken out between England and Holland; the vessels at the Cape were ordered to Saldanha Bay, to conceal them from English cruisers: Le Vaillant accompanied them. An English squadron discovered their place of refuge, and the captain of the one on board of which Le Vaillant's travelling equipage was embarked, blew it up to prevent its falling into the enemy's hands. Le Vaillant, thus stripped by an accident of all the property he carried with him, was hospitably treated by the colonists; the fiscal Boers advanced everything that was necessary to fit him out for the expeditions he contemplated, and the other government officers did all in their power to promote his enterprise. During the three years which he spent in the colony he made two principal excursions. In the first, which occupied him from the 18th of December, 1781, to the 2nd of April, 1782, he advanced westward, at no great distance from the coast, to the Great Fish river; ascended its most western branch to the frontier of the Gonaquois and Caffres (apparently near to where Beaufort now stands), and from thence made an excursion into the country of the Caffres. He returned by a more northerly route to Cape Town. His second excursion appears to have commenced in April, 1783, and lasted sixteen months: in this time he advanced northward beyond the Orange river—how far is uncertain, probably not so far as the map which Laborde constructed from his journals represents, but farther than his rival travellers admit. On his return to the Cape, Le Vaillant contemplated a voyage to Madagascar, but soon relinquished the idea, and embarked for Europe, on the 14th of July, 1784. In 1785 he returned to Paris.

Le Vaillant's first care on returning to Europe was to arrange his cabinet and prepare his journals for publication. The narrative of his first expedition from the Cape was published in 1790. In 1789, and again in 1795, efforts were made to have his cabinet purchased by government, but a price could not be agreed upon. In 1796 the second part of his Travels appeared. The first volume of the 'Natural History of the Birds of Africa' was published the same year; it was followed at intervals by four others; the sixth appeared in 1812; and Le Vaillant at his death left two additional volumes in MS. The 'Natural History of Parrots,' in 2 vols., was published 1801-5; 'The Natural History of Birds of Paradise,' 1801-6; 'The Natural History of Cotingas,' 1804; 'The Natural History of Calaos,' 1804.

The veracity of Le Vaillant has been questioned by Barrow and Lichtenstein, but on very insufficient grounds,—the loose statements of colonists speaking from recollection after a lapse of twenty or thirty years, or the non-appearance of a particular horde at the place where it was met by Le Vaillant after a similar interval. It may be conceded to Barrow that Le Vaillant was not an accurate geographer—he made no pretensions to the character. In his ornithological works he describes the appearance and habits of birds; in his travels he narrates his adventures while in pursuit of them. His accounts of birds are such as could only be supplied by one with whom it was a passion to follow them into their most secluded haunts and watch all their actions. The narrative of his travels throws light upon his character, and explains how he came to be capable of such persevering and minute observation. It is allowed by all who have had opportunities of observing, that he has described the character of the Hottentot with perfect fidelity. The narratives of Barrow, Campbell, Pringle, and events still in progress, show how truthfully he has delineated the robust recklessness of the Dutch colonists. Mistakes there are doubtless many, but the history of his travels is essentially a truthful book. It is a sincere faithful record of his impressions, of things in the light in which he viewed them; and the author delineates himself so unreservedly and so unconsciously in his eagerness, buoyancy, enterprise, vanity, warmth of affection, and unregulated enthusiasm, that it is easy to estimate the colouring effects of the medium through which all objects are viewed. There is a graphic power and life in Le Vaillant's descriptions, that give all his writings the charm of romance. He is great in the description of an elephant or rhinoceros chase: his faithful monkey Klees is a most felicitous picture; and there is scarcely a more delicate creation in poetry than his Gonaquoi girl Narina. Le Vaillant stands high in a class of writers, of which St. Pierre, Wilson (the ornithologist), and Audubon may be considered the types.

Neither Le Vaillant's entire devotion to his favourite pursuits, nor his innocent boyish enthusiasm for that kind of liberty which the possessor of the wealth and acquirements of civilised life can command in a genial climate among a rude and simple people, could enable him to escape entirely the dangers of the Revolution. He was only saved from the guillotine by the opportune death of Robespierre. After his liberation he retired to a small property which he possessed at La Neve, near Lauzun; and there, except at brief intervals, during which he was obliged to visit Paris to superintend the publication of his works, he spent the remaining thirty years of his life. There he lived through all the wars of the Revolution, hunting as eagerly, and with as little distraction from the turmoil around him, as if he had been among the woods of Surinam or in the valleys of the Cape. He died on the 22nd of November, 1824.)

(Le Vaillant, *Voyage dans l'Intérieur de l'Afrique*, and *Second Voyage dans l'Intérieur de l'Afrique*, and also incidental notices in his ornithological works; *Travels in Africa*, by Barrow, Lichtenstein, and Campbell; *Biographie Universelle*.)

VAISÊSHICA, or VAISESHIKA. [SANSCRIT LANGUAGE AND LITERATURE, p. 402.]

VAISON. [VAUCLUSE.]

VAKHTANG, the name of several kings of Georgia.

VAKHTANG THE FIRST, surnamed Goor Aslan, was, according to the chronicles of Georgia, the thirty-third king of that country, and a descendant of Sapor the First, king of Persia, who ascended the throne in A.D. 238, and having conquered Iberia, gave it to his son Mirian, who founded the third dynasty of Georgia. Vakhtang the First died about the end of the fifth century. He was a great warrior, and extended the frontiers of his empire, and strengthened them by the construction of many fortresses. The Georgian chronicles of that period are however very uncertain, and contain much fable mingled with truth.

VAKHTANG THE SECOND, of the dynasty of Bagratides, ascended the throne of his country in 1289, with the consent of the Mongols, whose dominion at that time extended over a great part of Asia. He died after a reign of three years, regretted by his subjects on account of his virtues.

VAKHTANG THE THIRD, of the same dynasty as the second of the same name, ascended the throne in 1301. The Mongols wishing to compel him and his nation to embrace Mohammedanism, he went to the court of the khan, in order to induce him to desist from his design against the Christians of Georgia. He did not succeed in his object, was imprisoned, and afterwards murdered in 1304. He is revered as a martyr.

VAKHTANG THE FOURTH belonged to the same dynasty as the preceding. He succeeded his father, Alexander, who became a monk in 1442. Having granted several provinces to his younger brothers, who governed them as his vassals, he assumed the title of king of kings. He died after a reign of three years, without issue.

VAKHTANG THE FIFTH, king of Kartli,* is also known under the name of Shah Nawaz, which he assumed on being obliged outwardly to conform to Mohammedanism. He ascended the throne in 1665. He lived a long time in Persia, at the court of Shah Abbas the Second, with whom he enjoyed great favour. This and other favourable circumstances enabled him to reunite under his dominion, with the approbation of the Shah of Persia, the disjointed parts of Georgia, and this country enjoyed under his rule a repose of which it had been long deprived. He died in 1676, having during his lifetime divided his dominions between his two sons.

VAKHTANG THE SIXTH, the legislator of Georgia, and the grandson of the preceding, ascended the throne of Kartli in 1703, after his brother Khosrew, who had become a Mohammedan, and during the lifetime of his father Leo, who was detained in Persia. Vakhtang assumed the government in the name of his father, and went to the court of Persia in order to obtain the confirmation of his dignity. The Shah would not grant the confirmation, except on condition of Vakhtang embracing Mohammedanism, which having refused to do, he was imprisoned, and his brother Jesse, who complied with the condition, was put in his place. Jesse governed Kartli two years, during which it suffered from internal troubles and the inroads of the Lesghis. Vakhtang, who had been imprisoned all this time at Ispahan, resolved, in order to restore tranquillity to his country, outwardly to conform to Mohammedanism. He thus conciliated the Shah, who nominated Vakhtang his sirdar, and appointed him governor of the province of Azerbijan, and sent his son Bakar to govern Kartli, whence Jesse, having abjured the Islam, had retired. Vakhtang remained seven years in Persia before he was permitted to return to his own country. His first care was to improve the laws and the state of religion. He therefore assembled such learned men as he could find, translated from the Greek the statutes of the emperor Leo the Philosopher, accommodated them to the regulations of different Armenian and Georgian kings, added to them several of his own, and thus formed the code which is known by his name. He also undertook the printing of the Bible, which had been, as it is believed, translated as early as the fourth century from the Greek into the Georgian, and corrected in the eleventh by three Georgian princes, monks of the Iberian convent on Mount Athos. This version, being corrupted by successive copyists, required great emendations: the version of the books of the Ecclesiasticus and of the Maccabees had been entirely lost. These were however supplied before the printing was undertaken, by Vakhtang's uncle, Archil, king of Imiritia, who, being expelled from his country, died in Russia. Vakhtang established at Tiflis a printing-press, and printed the Gospels, the Acts, he Psalms, and several liturgies and prayer-books; but he court of Persia, perceiving that Vakhtang, instead of following the Koran, promoted Christianity, sent an army against him. Vakhtang, after having defended himself for some time at Tiflis, was finally expelled; his printing establishment and all the published books which could be found were destroyed; and his brother Constantine, who had become a Mohammedan, was established in his place. Vakhtang called the Turks to his assistance, and submitted o the authority of the Sultan; but these protectors, having occupied the country, gave the throne to his brother esse, who again became a Mohammedan.

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* Georgia was divided into several independent principalities, some of which were occasionally united. [GEORGIA.]

In the invasions and wars between the Turks, Persians, nd Afghans, three-fourths of the population of Georgia were destroyed; and Vakhtang, after having wandered a ong time with his most faithful adherents in the mountains, ought protection from Peter the Great, who invited him o Russia. Vakhtang went to Russia, in 1725, with his amily, five bishops, and many inferior clergy of Georgia. Peter had just died, but his successor, Catherine the First, granted Vakhtang a large pension and considerable estates. Vakhtang resided in Russia till 1734, but in that year he esolved to make an attempt to recover his dominions by he co-operation of the Shah of Persia. The empress Anna consented to Vakhtang's project, but gave him instructions how to act in Persia, and in what manner he hould induce the Georgians as well as the Caucasian ighlanders to enter the Russian service, in order to bring bout their entire submission to the authority of Russia. Vakhtang started for his diplomatic journey, in company with a Russian general, but fell ill on his way, and died at Astrakhan. His descendants exist to the present day in Russia under the name of the Georgian (Gruzinski) princes.

Vakhtang the Sixth was a man of considerable talents d attainments, which is shown by his engaging in literary ursuits amidst all the troubles with which his life was gitated. He wrote the history of Kartli, which is considered to contain very important materials for the history Georgia, and is known under the name of the 'Chronicle Vakhtang the Sixth.' One manuscript copy of this ronicle exists at Rome, and another at St. Petersburg, the Rumianzoff Museum. Des Guignes employed it r the names of the kings of Georgia in his 'Histoire des Huns,' &c. It has been also mentioned by Guldenstadt nd Klaproth.

(Klaproth, *Tableau du Caucase; Encyclopedical Dictionary of St. Petersburg.*)

VAKHUSTA, a natural son of Vakhtang the Sixth, king f Kartli (Georgia). He completed, with his brother, Prince Bakar, the printing of the Bible in Georgian, which ad been only partly done by their father, Vakhtang the ixth. He established for that purpose, in his house near Moscow, a printing-press, taught the art of printing to everal Georgian clergymen, and completed the first edition of the Bible in the language of his country in 1743. The printing-press was afterwards transferred to Moscow, where everal religious works in Georgian were printed. Vakhusta wrote a history of Georgia, which still remains in manuscript.

VAL DE PEÑAS, a town of Spain, in the province of La Mancha and district of Ciudad Real, is situated in a fertile plain, on the road leading from Madrid to Andalucia, in 38° 45′ N. lat. and 3° 54′ W. long. The town is well built, and the streets, though narrow, are clean and well paved. The mansion of the marquis of Santa-Cruz, and the Tercia, or warehouse of the royal tithes, are conspicuous among many other good edifices. The environs of the town are mostly planted with vines, which produce he excellent red wine known as 'vino de Val de Peñas,' which is much in request at Madrid, and approaches in uality to some of the stronger Bordeaux wines. Corn, il, and saffron are also grown in the neighbourhood. Some coarse linens and soap are manufactured in the own, which is also celebrated for a peculiar yellow dye or woollens, made with the flowers of the saffron plant. The town holds a fair on the 7th of January, which is greatly attended by the inhabitants of the province. The population, according to Miñano (vol. ix., p. 155), amounted in 1828 to 10,248 inhabitants.

VALAIS (*Wallis*, in German), a canton of the Swiss Confederation, consists mainly of a great longitudinal valley, the largest in all Switzerland, running in a general direction from east to west for nearly a hundred miles between two lofty and massive chains of alps, one of which, on the south side, divides it from Italy, and the other from the canton of Bern on the north. Both chains are connected at the eastern end of the Valais with the central group of the St. Gothard by means of the Gallenstock, the Furka, and the Mutthorn. The Rhône has its sources in a glacier which lies on the west side of the Gallenstock and the Furka, whence it flows westward through the whole length of the Valais, receiving numerous affluents on both banks. These streams are the drains of the two great chains, the offsets of which form sixteen transverse valleys, some of them more than twenty miles in length, which slope down into the great valley of the Rhône. Near St. Maurice the valley of the Rhône becomes contracted between two lofty masses, the Dent de Morcles, which forms part of the northern chain, and the Dent du Midi, a projection of the southern chain, which divides the Valais from Savoy, leaving between them at the bridge of St. Maurice merely space enough for the river. This is the geographical termination of the Valais, but the canton continues to stretch over a narrow and partly mountainous tract along the left bank of the Rhône, and between that river and the Alps of Savoy, for about 16 miles farther down, to the entrance of the river into the Leman Lake: the opposite or right bank below the bridge of St. Maurice belongs to the Canton de Vaud.

The area of the Valais is estimated at about 1980 square miles, of which more than one half consists of high alps and glaciers, and the remainder of lower offsets and intermediate valleys. The breadth of level ground in the valley of the Rhône varies from a quarter of a mile to three miles. The heat in the summer is very great in the valley, especially in the neighbourhood of Sion and Siders (Sierre, in French), where the fig, mulberry, almond, and pomegranate thrive in the open air. The level of the Rhône at St. Maurice is about 200 feet above that of the Leman Lake, and about 500 feet between Sion and Sierre. The lake itself is 1150 feet above the level of the sea. The vine and Indian corn are cultivated up to the height of 1000 feet above the level of the lake, barley to 2500, and potatoes to 3000. Walnut, chestnut, cherry, apple, and pear trees are abundant. In several localities excellent wine, both white and red, is made: the malmsey of Sion and Sierre rivals that of the southern coasts of Italy and Spain. Cider is made in other districts. In common years the crop of corn is sufficient for the consumption. The forests are extensive: great quantities of timber have been cut down of late years and sent by the Rhône into France. The horned cattle are reckoned at 47,000 head, and the sheep and goats at 55,000. There are about 2200 horses and 1500 mules. Mines of iron, copper, lead, silver, cobalt, and zinc have been found. There is little manufacturing industry in the country.

The population of the Valais amounted, in 1837, to 75,798 individuals: in 1816 it was only 62,909. The inhabitants of the highlands are stronger and healthier than those of the banks of the Rhône. In the Lower Valais cretinism is a common infirmity. The Valaisans are strict Roman Catholics, and much attached to their devotional practices; but they are neither fanatical nor intolerant towards strangers. A patois of the Romance is spoken in the lower or western part of the canton; German in the upper or eastern part.

The canton is divided into thirteen communities or little republics, called dixains, every one of which has its council, the members of which are appointed by the respective communes, and which regulates all local affairs. Each dixain sends four deputies to the diet, or legislature of the whole canton, which meets every year at Sion. The diet appoints the members of the council of state, or cantonal executive, and sends also the deputy or deputies to represent the canton in the federal diet of all Switzerland. The bishop of Sion is president of the diet of the Valais, and has four votes.

In the middle ages the Valais was an independent republic, in which the seven dixains of the Upper or Eastern Valais, in conjunction with the bishop of Sion, ruled by right of conquest over the districts of the Lower or Western Valais. The bishop of Sion had the jus gladii, the power of life and death, and money was struck in his name. The Valais was allied to the cantons of Switzerland, and more particularly to the Waldstätten. At the time when the French invaded Switzerland, in 1798, the Lower Valais claimed equal political rights with the upper country: the French hastened to interfere in the quarrel, and the consequence was a destructive warfare, which continued during the year 1799, and in which the Upper Valaisans made a desperate, though in the end ineffectual, resistance against the French, who forced their way by massacre, plunder, and fire into those remote districts. Afterwards, when Bonaparte, having assumed the government of France, acted as mediator in the affairs of Switzerland, he detached the Valais from the Swiss Confederation, and formed it into a distinct republic under the protection of France. He then began to make the new military road through the Valais and over the Simplon into Italy. The road being finished, he united by a decree, in 1810, the Valais to the French empire by the name of the department of the Simplon. The Valais was subject to the conscription, and furnished about 800 men yearly to Napoleon's army. In 1814 the country was restored to its independence, and made a canton of the new Swiss Confederation. A constitution was formed, in which the political distinction between the Upper and the Lower Valais was obliterated, but the aristocratic principle was maintained in the elections. Many of the members of the communal councils were appointed for life; others were appointed for twelve years, at the expiration of which they were often re-elected. Since 1830, after much remonstrance and disturbance, more democratic forms have been introduced.

The principal towns of the Valais are:—1, Sion (Sitten, in German), an old-looking town, surrounded with walls and towers and a ditch, in a picturesque situation at the foot of two insulated rocks, on the right bank of the Rhône: it has a large cathedral, several other churches, a fine old town-house, a college of Jesuits, a curious old tower, said to have been raised by Charlemagne, two ruinous old castles on the summit of the two hills, an hospital, an arsenal, and about 2400 inhabitants. It is the border district between the French or Romance patois, which is spoken in the Lower or Western Valais, and the German, which is the language of the Upper or Eastern country: both languages are spoken in the town. Sion is the antient Sedunum, a Roman military station: it is called 'Civitas Sedunorum' in an inscription in honour of Augustus, which is preserved in the cathedral. It was the birthplace of Cardinal Schinner, bishop of Sion, who figured in the Italian wars in the early part of the sixteenth century. 2, Siders (in French, Sierre), ten miles east of Sion, is a large village in a beautiful and fertile country: it has some fine houses, belonging to some of the wealthiest families of the Valais; and an old castle with towers in the neighbourhood. 3, Brieg, in the Upper Valais, a handsome village near the foot of the Simplon, has a college and church belonging to the Jesuits, with a library, a convent of nuns, and some other good buildings. 4, Martigny (Martinach, in German), the chief town of the Lower Valais, built on the site of the antient Octodurum, a Roman military station, has several good buildings, inns, and shops, and above 3000 inhabitants, including the territory of the commune. The high-road of the Simplon, and that leading over the St. Bernard into Italy, pass through Martigny, and give a bustling appearance to the place. The Dranse, an impetuous torrent coming from the group of the St. Bernard, joins the Rhône near Martigny. 5, St. Maurice, on the left bank of the Rhône, ten miles below Martigny, a small town of 1300 inhabitants, is remarkable for its antient abbey, belonging to the canons of St. Augustin, whose mitred abbot bears the title of count, and is immediately subordinate to the pope. The abbot and chapter have the gift of eight benefices, which are filled by the canons. There is a college annexed to the abbey, in which the classical languages, mathematics, physics, history, and geography are taught. This and the Jesuits' colleges at Sion and Brieg are the only upper schools in the canton. The abbey of St. Maurice has a library with some valuable MSS. The well-known convent and hospice of the St. Bernard is in the territory of the Valais. [BERNARD, ST.]

The Valais is a very remarkable country for its stupendous scenery, the variety of its climate and of its vegetable productions, and for its geological and mineralogical phenomena. The bridge of St. Maurice affords the only level entrance into the country: on every other side it is not accessible except by passes over the lofty Alps.

(Leresche, *Dictionnaire Géographique de la Suisse.*)

VALANÇAY, or VALENÇAY. [INDRE.]

VALCKENAER, LOUIS CASPAR, a celebrated Dutch scholar, was born in 1715 at Leeuwarden in Friesland. He studied at Franeker, and although he had chosen philology as his department, he devoted considerable time to philosophy and theology. After the completion of his studies he was for a time master in a school, until, in 1741, he was appointed professor of Greek at Franeker, in the place of Hemsterhuis. In 1755 he obtained the professorship of Greek and of archæology in the university of Leyden, which office he held until his death in the year 1785. The life of Valckenaer, like that of most scholars, presents few incidents worthy of note, and all that we can say of him is that he was a very modest man, and contributed greatly to maintain the high reputation of the university of Leyden. He possessed a very extensive knowledge of all matters connected with antiquity, but the department in which he excelled was his critical and grammatical knowledge of the Greek language; and what he has done in this respect, partly in his editions of Greek writers and partly in separate dissertations, has secured him a distinguished place among the illustrious scholars of his country. Among his editions of Greek authors, the following deserve especial notice:—1, The work of the grammarian Ammonius, 'De Differentia adfinium Vocabulorum,' to which are added some other antient grammatical works, Leyden, 1739, 4to. (reprinted with some additions at Leipzig, 1822, 8vo.); 2, the 'Phoenissae' of Euripides, with a very excellent commentary, the Greek scholia, and a Latin translation by H. Grotius, Franeker, 1755, 4to. (reprinted at Leyden in 1802, 4to., and at Leipzig, 1824, 2 vols. 8vo.); 3, the 'Hippolytus' of Euripides, with a Latin translation by Ratallerus, and notes by the editor, Leyden, 1768, 4to. (reprinted at Leipzig, 1822, 8vo.); 4, the 'Idyls' of Theocritus, with a Latin version by Wetstein, Leyden, 1773, 8vo. The commentary, especially that on the idyl called the 'Adoniazusae,' is full of the most exquisite grammatical remarks. Valckenaer also wrote notes on other writers, such as Herodotus and Callimachus, which were inserted in the editions of others. Those on Herodotus are contained in the editions of Wesseling and Schweighaüser. Among his separate treatises, his 'Diatribe in Euripidis Perditorum Dramatum Reliquias,' which is contained in his edition of the 'Hippolytus,' was printed separately at Leipzig, 1824, 8vo. This is one of the most masterly treatises ever written on matters of antiquity, and should be studied by every scholar. His smaller essays were collected and published at Leipzig, in 1808, 2 vols. 8vo.

VALCKENAER, JAN, the only son of Louis Caspar Valckenaer, was born at Leyden, 1759. He studied jurisprudence in the university of Leyden, and was afterwards appointed professor of the same department in the university of Franeker. His reputation as a distinguished jurist, and still more his political sentiments, for he was one of the leaders of the anti-Orange party, procured him in 1787 the professorship of jurisprudence in the university of Utrecht. But in the same year the rights and claims of the hereditary Stadtholder of the Netherlands, William V., were victoriously established by the armed assistance of Prussia, and Valckenaer was obliged to quit Holland. The Dutch patriots, to whom Valckenaer belonged, were only intimidated, but not annihilated. They looked to France for support, and on the 6th of February, 1793, Valckenaer, together with other representatives of the patriots, presented himself at the bar of the National Assembly of France, and requested them to send an army into Holland to support the party of the patriots. In 1795 a French army under Pichegru made its appearance in the Netherlands, and Valckenaer returned to Holland and was appointed professor of public law in the university of Leyden. He now started a patriotic journal called 'The Advocate of Batavian Liberty,' which however did not last long, for in the beginning of the year 1796 he was sent as ambassador of the Batavian republic to Spain. He returned to Holland in 1799, but was sent again in the same year as minister plenipotentiary to the court of Madrid. He remained there till 1801, and after his return he withdrew for a time altogether from public life. But soon after he was sent on a special mission to Berlin, to settle some financial matters, which however had not the result which was anticipated. On the 16th of March, 1810, Louis Napoleon, king of Holland, sent Valckenaer on a mission to Napoleon, to avert a rupture with the French emperor, and to prevent, if posable, the contemplated incorporation of the Netherlands with France. A few months later Louis Napoleon abdicated, and the events which followed induced Valckenaer to withdraw from public life. He spent the remainder of his days in study and in the enjoyment of the company of a select circle of friends, partly at Amsterdam and partly at his country-seat near Haarlem, where he died on the 25th of January, 1821, at the age of sixty-two. Valckenaer was an able politician and statesman, but he had the misfortune to see nearly all the plans for which he had struggled thwarted by the circumstances of the time. He wrote several political pamphlets, which have been praised for the soundness of their arguments and the eloquence with which they are treated.

VALDAI. [Russia.]

VALDENSES. [Vaudois.]

VALDES, or VALDESSO, GIOVANNI, a native of Spain, studied law, was employed in several missions by the emperor Charles V., and appears to have lived to an advanced age in retirement at Naples. He died in 1640. He carried from Germany to Italy several works of Melanchthon and other reformers, and adopted several opinions condemned by the Roman Catholic church, to which he converted some of his familiar friends. Neither Valdes nor any of his disciples during his life separated themselves from the Romish communion; and he remained unmolested on account of his opinions, although they appear to have been generally known. A similar spirit of negative or latent heresy prevailed at the same time in different parts of Italy, in Piedmont, at Bologna, Padua, and Vicenza. In 1542 the Italian governments, especially that of Naples, took the alarm, and the friends of Valdes were obliged to fly or recant. Valdes has been claimed by the Socinians, but it is difficult from the few works attributed to him, and published after his death, to glean what his doctrinal opinions really were. That which was published at Basle in 1550, with the title 'Le cento dieci Considerazioni del S. Giovanni Valdesso, nelle quali si ragiona delle Cose piu utili, piu necessarii, e piu perfette della Cristiana Professione,' consists of commentaries on the gospels of St. Matthew and St. John, the Epistle to the Romans, and the Epistle to the Corinthians. It is exclusively practical. Bayle attributes to Valdes two dialogues printed at Venice without date or author's name, which, judging from their titles, must be rather historical than polemical.

VALDIVIA is a town in Chile, situated in 39° 49′ S. lat. and 73° 18′ W. long., at the inner extremity of an estuary formed by the confluence of several rivers, among which the Calla-Calla and the Cruces are the largest. The town is built at the mouth of the first-named river: it consists of a number of scattered wooden houses surrounded by a forest of apple-trees. According to Darwin, no country on the globe is more favourable to the growth of the apple than the vicinity of Valdivia. Its population according to some statements, does not exceed 800 individuals, whilst others increase it to 2000. This might be a matter of surprise, when it is considered that the harbour of Valdivia is the best harbour on the west coast of America between S. Carlos de Chiloe and Guyaquil, if we did not know that the whole surrounding country is still in possession of independent tribes, and covered with large forests. A few spots only are cultivated. The town owes its origin to a colony of Dutchmen, who settled there about the middle of the seventeenth century for the purpose of carrying on a smuggling trade with the Spanish colonies. The Dutch were soon expelled by the Spaniards, who expended great sums in fortifying the harbour and rendering it impregnable. It remained in the hands of the Spaniards up to 1820, when the Chilians, commanded by Lord Cochrane, took it from them. Since that time the numerous fortifications erected by the Spaniards have been neglected and have fallen into decay. The mouth of the æstuary, which is 15 miles from the town, is more than two miles wide, and the channel by which it is entered has from 14 to 19 fathoms of water, which decreases gradually to eight fathoms at the narrowest part, which is three-quarters of a mile wide. Near this strait, along the southern shores of the æstuary, is the best anchorage for large vessels, under the high rocks which surround the castle of Coral. Farther east the æstuary is crossed by a bar, produced by the mud brought down by the numerous rivers which enter it. The water on the bar is less than four fathoms deep, and decreases at the shallowest part to less than two fathoms. Only vessels of moderate size therefore can sail up to the town. Captain Fitzroy states that the safe anchorage of this port is very limited, on account of the extensive banks which are formed by the mud and sand brought down by the rivers; and that these banks increase yearly. The commerce of Valdivia is limited to the exportation of boards, which are brought to this place by the Indians from the interior, and find a ready sale in all the ports of South America bordering on the Pacific.

(Miers, *Travels in Chile and La Plata*; Fitzroy and Darwin, in the *Narrative of the Surveying Voyages of the Adventure and Beagle.*)

VALENCE, a town in France, capital of the department of Drôme, 295 miles in a direct line south-south-east of Paris, or 352 miles by the road through Melun, Auxerre, Châlons-sur-Saône, and Lyon; in 44° 56′ N. lat. and 4° 54′ E. long.

Valence existed in the days of the Romans, by whom it was called Valentia, and was the capital of the Segalauni, or Segovellauni. It is mentioned by Ptolemy (who writes the name Οὐαλεντία) as a colony. It was included in the province of Viennensis, a subdivision of Gallia Narbonensis. In the time of the later Western emperors it was a place of considerable strength, and afforded a refuge to Constantine, who had assumed the purple in Britain, and was fruitlessly besieged here by Sarus the Goth, whom Stilicho had sent against him. Jovinus, another usurper, sought refuge here, but the town was taken by the Visi-Goths, who, under their king Ataulfus, had taken part against him. It was afterwards subject to the Burgundians, and passed from them to the Franks. In the middle ages it formed part of the kingdom of Arles, and was the capital of the Valentinois, a district of Dauphiné: this district was included in the Marquisate (not the county) of Provence, held by the counts of Toulouse, and was after some changes united to the crown. The territory of Valentinois was made a duchy and conferred by Louis XII. on Cæsar Borgia, a natural son of Pope Alexander VI. It was conferred by Henri II. on his mistress, Diana of Poitiers.

The town is in a fertile plain on the left bank of the Rhône, a few miles below the junction of the Isère, and is united by an iron suspension-bridge with the opposite bank. It is ill laid out, with winding and narrow streets, and ill built; and is surrounded by old walls, out of condition, flanked with towers, and having few gates. The high road from Paris and Lyon to Marseille and the adjacent parts of the south of France does not pass through the town, but skirts the wall on the outside and passes through the suburb of Saunière, adjacent to the town on the south side. On the north side of the town is a citadel called 'Le Gouvernement,' fronting a parade or exercise-ground planted with trees. The buildings of the town have little claim to notice. The principal are—the cathedral, dedicated to St. Apollinaire; the former residence of the bishop; the prefect's residence, formerly an abbey, with extensive gardens; the house in which Pius VI. resided, also having delightful gardens; and a private house, the front of which is accounted by Vaysse de Villiers one of the richest specimens of Gothic architecture in France. There are two public walks. There are scarcely any Roman remains existing.

The population of the commune of Valence, in 1826, was 10,283; in 1831, 10,406 (8898 of them in the town itself); and in 1836, 10,967. The townsmen manufacture cotton-yarn, printed cottons, silks, gloves, hosiery, and cutlery; there are dye-houses, tan-yards, rope-walks, saw-yards for marble, tile-yards, potteries, lime-kilns, and a great number of cartwrights' shops. Trade is carried on in the wines, fruits, and silks of the south of France; in brandy, liqueurs, corn, and manufactured goods: there are six fairs in the year. The well-known Hermitage and St. Peray wines are grown in the neighbourhood of Valence.

There are in the town two Catholic churches besides the cathedral, a Lutheran church, a nunnery, two seminaries for the priesthood, a high school or college for the commune, a drawing-school, and a public library of 14,000 volumes; two hospitals, one of them for foundlings; a theatre and baths, barracks, a school of artillery, and an arsenal. Near the town are a château and park, formerly belonging to the dukes of Valentinois. A number of antient families are resident in Valence, and the society of the place is very good. There are a subordinate court of justice and some fiscal government offices.

Valence had a university, founded by Louis XI., while dauphin, A.D. 1452, and confirmed in its privileges by him after his accession to the throne, A.D. 1475. According to Piganiol de la Force, the university of Valence was not a new establishment, but was the university of Grenoble (founded A.D. 1339, by Humbert II., dauphin of the Viennois) transferred to Valence in A.D. 1452. The first buildings were erected at the cost of the town; but the university having acquired wealth, the old buildings were replaced by new ones, neat and convenient though not magnificent, built with the university funds.

The bishopric of Valence comprehends the department of Drôme; the bishop is a suffragan of the archbishop of Avignon.

The arrondissement of Valence includes 101 communes, and is subdivided into ten cantons or districts, each under a justice of the peace; the population, in 1831, was 135,193.

(Malte-Brun, *Géographie;* Vaysse de Villiers, *Itinéraire Descriptif de la France;* Millin, *Voyage dans les Départemens du Midi de la France; Dictionnaire Géographique Universel.*)

VALENCE. [TARN.]

VALE'NCIA, formerly a kingdom, now a large province of Spain, in the eastern part of the peninsula, between 37° 50′ and 40° 46′ N. lat. and 12′ E. long. and 1° 25′ W. long., consists of a long and comparatively narrow strip of land extending along the Mediterranean, and bordering to the south on the province of Murcia, to the west on the provinces of Cuença and Teruel and the Sierra de Albarracin; and to the north on the province of Lerida. Until the year 1832 Valencia was called a kingdom (Reyno de Valencia), having once formed part of the crown of Aragon; but since the late division of the Spanish territory, this district has been subdivided into three provinces, Valencia, Castellon de la Plana, and Alicante. Although considerably reduced in extent, Valencia is still one of the finest and most productive provinces of the peninsula. A large proportion of the surface, particularly in the north and west, is mountainous, but the plain country, which stretches along the coast, and is watered by the rivers Xucar, Guadalaviar, and Segura, is one of the most fertile and best cultivated spots in Europe. The plain or vega of Valencia, especially, is a delightful spot; it is about thirty miles long and twenty wide: on three sides it is bounded by the mountains of Segura, and on the fourth by the sea. The whole of this vast extent is planted with olive, mulberry, ilex, algaroba, orange, and palm trees, and has the appearance of an immense garden. Such is the fertility of the soil, that two and three crops in the year are generally obtained, and the greater part of the land returns eight per cent. The rice crops are the most valuable, and are chiefly produced in the tract which is irrigated by the Albufera, a large lake in the neighbourhood of Valencia. Rice being the principal food of the lower classes, the crop is generally consumed in the province, with the exception of a small quantity which finds its way into Castile and Andalucia. The annual produce is estimated at 12,000,000 arrobas, the average price of which may be taken at 3*s.* the arroba, or about 1½*d.* per lb. The other chief product is the white mulberry, once the source of great wealth: it was worked in the silk-factories of Valencia. In 1828, when Miñano wrote, the produce of silk from the vega of Valencia only amounted to one million of pounds yearly, the greater part of which was exported in its raw state, at an average price of from 8*s.* to 10*s.* per pound. But, according to the last official returns, the produce has greatly increased since, owing to demands from the manufacturers of Lyon and other towns in the south of France. The export of fruit from Valencia is also considerable, particularly of raisins. The raisins are of two kinds, the muscatel, and an inferior and smaller raison, called *pasa de legia;* but neither is equal to the raisins of Malaga. In 1829, 47,000 quintals of the best, and 42,000 of the inferior sort, were exported, exclusively for the English market. The export of figs, oil, and wine from the province and different ports of Valencia is also very great, particularly the wine, called Beni Carlo, which comes from a town of that name. This wine is chiefly shipped to Cette, whence much of it comes by the canal of Languedoc to Bordeaux, and is used to give body and colour to the clarets.

No great number of cattle or horses are kept by the Valencians; and the sheep, though numerous, yield wool of indifferent quality. Mercury, copper, sulphur, arsenic, argentiferous lead, iron, coal, &c. are among the mineral products, but they are procured only in small quantities. The manufactures are unimportant; woollen and linen stuffs are indeed made in several towns of the province and silk goods in Valencia, Gandia, and other places but they are chiefly consumed within the province. The fabrication of satins, silk ribbons, and velvets has of late so much improved and increased as to render a supply from France no longer necessary. Cloth of superior quality is also made at Alcoy, and silk is no longer exported in the raw state, but spun at Valencia and other places by steam. Cordage is made from the fibre of the esparto (stipa tenacissima), aloe, juncus, &c.; and tiles (azulejos), soap, glass, paper, pottery, and earthenware are exported to all parts of Spain.

In 1828, before the division, the population of the kingdom of Valencia amounted to about one million of inhabitants; but it is supposed that what is now called the province of Valencia does not contain much above one half of that number. The dialect spoken in the province, though much akin to the Catalonian, differs considerably from it, as it retains more of the Provençal. Upon the annexation to the Spanish monarchy, Valencia, like the other provinces composing the kingdom of Aragon, preserved its representative body and its privileges; but the inhabitants having taken an active part against the Bourbon dynasty during the war of the succession, Philip V. deprived the province of its old constitution, and obliged the inhabitants to conform in every respect to the laws of Castile.

Those who wish for information on the geography, climate, and natural productions of the kingdom of Valencia may consult Cavanilles, *Observaciones sobre la Historia Natural, Geografia, Agricultura, Poblacion, y Frutos del Reyno de Valencia*, Mad., 1795-97.

VALE'NCIA DEL CID, a city of Spain, capital of the province of Valencia, on the Guadalaviar, about four miles from its mouth, and 188 miles east-south-east from Madrid, in 39° 28′ N. lat. and 0° 24′ W. long. Valencia stands in a wide plain, called *La Huerta*, or the Garden, on the bank of the Guadalaviar, which washes its walls and separates it from its suburbs, with which it communicates by five stone bridges of from ten to thirteen arches. Valencia was a city of some importance under the Romans, being a colony and the capital of the Edetani (Valentia Edetanorum). The Arabs under 'Abdu-l-'azíz, son of Músa Ibn Nosseyr, took it in A.D. 712. From that time it continued annexed to the empire of Cordova. On the overthrow of the dynasty of the Beni Umeyyah, in A.D. 1452-6, Abu-l-hasan 'Abdu-l-'azíz, grandson of the celebrated Al-mansúr, who was then governor of Valencia and the districts appertaining to it, declared himself independent, and reigned until A.D. 1060, when he was succeeded by his son 'Abdu-r-rahmán (others call him 'Abdu-l-malek), who became in time the son-in-law and the vassal of Al-mámún, king of Toledo. Having offended his liege lord by refusing to join him with his forces in an attack upon Cordova, 'Abdu-r-rahmán was dispossessed of his dominions, and a governor appointed in his stead. Soon after however the friends of 'Abdu-r-rahmán stirred up a revolution in Valencia, and having expelled the governor appointed by Al-mámún, re-established 'Abdu-r-rahmán on the throne. When, in A.D. 1085, Yahya Al-kádir, the grandson of Al-mámún, surrendered his capital, Toledo, to Alfonso VI. of Leon, it was stipulated between the two kings that the Christian would assist Yahya in regaining possession of Valencia. Alfonso did so; but scarcely had Yahya reigned two years when a portion of his subjects revolted against him, and at the instigation of an influential chief named Ibn Jeháf, loudly called upon him to dismiss the Castilian bands which he still retained in his pay. Yahya was obliged to yield, and the Christians under Alvar Yañez were accordingly expelled from his dominions. This being done, Ibn Jeháf, who was in correspondence with the Almoravides, attacked the royal palace, slew Yahya, and surrendered the city to them. The news of this revolution having reached Rodrigo Diaz de Bivar, better known as the Cid, who about that time was indiscriminately assail-ng the Moorish dominions, he marched to Valencia and besieged the place, on the plea that the murdered Sultan was his friend and ally. After a siege of several months Valencia was taken, and Ibn Jeháf was burnt alive in the principal square of the city. The Almoravides, however, hastening from all parts of Spain, Rodrigo was compelled o evacuate the place. Owing to this momentary occupaion of Valencia by the bands commanded by Rodrigo de Bivar, the city received the name of Valencia del Cid. Valencia continued in the hands of the Almoravides, and fter them of the Almohades, until Jayme I. of Aragon ook it from Zeyyán Ibn Mardanísh on the 29th of September, A.D. 1238. Valencia was taken by the French under Suchet, in 1812, and held by them till June, 1813.

Valencia is nearly circular, and about 2¼ miles round: t is enclosed by massive walls built by the Moors, flanked t intervals by round towers. The gates are four; that of he Cid (la puerta del Cid) being very remarkable for its architecture. The streets, like those of most Moorish-built cities, are narrow, crooked, unpaved, and frequently destitute of thoroughfares; but those which have been lately built on the site of demolished convents and churches are wider and tolerably well paved. The city is furnished with public sewers of great solidity, which are said to be the work of the Romans: it has also good quays, faced with stone and planted with trees, which line the whole length of the Guadalaviar. The cathedral is of mixed architecture, with a very lofty tower called 'el Miquelete,' from he top of which a commanding view of the whole plain or 'huerta' of Valencia is obtained. It contains numerous altars richly decorated with gilt-work and the finest marbles obtained from the quarries in the province, as well as with paintings by Juan de Juanes, Espinosa, Ribalta, Victoria, a pupil of Carlo Maratti, and other painters of the Valencian school. The Lonja (Exchange), the custom-house, el Temple, a palace built by Charles III. for he military order of Montesa, the archbishop's palace, the college of Pius V., and several noble residences, are worthy f notice. The university, founded in 1411, was formerly considered the best in Spain, particularly for the study of medicine. In 1830 it had nearly 2500 students. There was once a magnificent library attached to it, which contained a valuable collection of antient manuscripts, made by the celebrated Perez Bayer, the author of the work 'De Nummis Samaritanis,' Valencia, 1781, and other learned works; but it was entirely burnt by the explosion of a shell during the Peninsular war: another library has since been formed with the books of the suppressed convents, as well as a gallery of paintings and sculpture, collected from the various religious houses in the province. Besides the university, there are at Valencia six colleges and many inferior academies; as well as a public school where the fine arts are gratuitously taught.

To the west of Valencia is a large lake, called Al-buféra, the waters of which are used in irrigating the rice-grounds in the plain. The port of Valencia is at Grao, about two miles distant. It is connected with the city by a broad planted avenue, which constitutes a favourite promenade for the inhabitants. The harbour is suitable only for boats, and the roadstead is exposed to the south and south-west gales. Various plans have been suggested to render it more commodious, but hitherto they have produced little or no effect. There are several histories of Valencia, among which that of Martin Viçyana (*Cronyca de la Inclyta y Coronada Ciudad*, &c., Valencia, 1564, fol.) is considered the best. There is another, by Escolano (*Historia de la Insigne Ciudad y Reyno de Valencia*, Val., 1610-11, fol.). According to Miñano, the population of Valencia, in 1828, amounted only to 65,840; but it is generally believed to have considerably increased since. The inhabitants are chiefly devoted to agriculture, although many branches of trade flourish in the city. Velvets, taffetas, flowered damask, and other silk-stuffs are still manufactured, though not to such an amount as when the markets of Spanish America were open to them. Woollens, camlets, hats, table-linen, gauzes, artificial flowers, pottery and earthenware, glass, paper, are also made in small quantities.

There are in Spain several other towns called Valencia: as Valencia de Alcantara, in the province of Estremadura, not far from the frontiers of Portugal; Valencia del Ventoso, also in Estremadura, Valencia de Don Juan, in the province of Leon, &c.

VALENCIENNES, a town in France, capital of an arrondissement in the department of Nord, 114 miles in a direct line north-north-east of Paris, or 125 miles by the road through Senlis, Roye, Peronne, and Cambray; in 50° 21′ N. lat. and 3° 31′ E. long.

The name of this town (which is Latinized Valentianae) seems to indicate a Roman origin, but it is not mentioned by any antient writer, nor does any historical interest attach to it until quite modern times. It was taken by Louis XIV. A.D. 1677, and was fortified by Vauban; and by the treaty of Nimeguen, A.D. 1678, was ceded to France. It was taken by the allies after a brave defence in the early part of the revolutionary war (1793), and retaken easily by the French the next year. The town is situated on the river Escaut or Schelde, by which it is divided into two unequal parts, the greater part being on the south-east or right bank of the river. The town is irregularly laid out and ill built. The fortifications are extensive, and on the west side of the town is a citadel in an island formed by the Escaut. There is a good place or square, and the front of the town-house deserves notice.

The population of Valenciennes, in 1826, was 19,841; in 1831, 18,953; in 1836, 19,499. The chief manufactures are of linens and lawns; but lace, cambric, earthenware, children's toys, and powder-blue are made; and wire-weaving, dyeing, and tanning are carried on: there are a number of mills and a great number of forges for iron. Near the town are the important coal-works of Anzin or Anzain. [ANZIN.] Trade is carried on in coal, fire-wood, timber, corn, and seeds for oil.

Valenciennes has a subordinate court of justice and a commercial tribunal, and one or two government offices, military or fiscal. There are a high school for the commune, a public library of 8000 volumes, a society of sciences, arts, commerce, and industry; a gallery of pictures and an academy for painting; a museum of natural history; three hospitals, one of them for foundlings, another for the military, and the third a general hospital; and four establishments of the Sisters of Charity.

The arrondissement of Valenciennes has an area of 244 square miles, and comprehends 80 communes: it is divided into seven cantons or districts, each under a justice of the peace: the population was 123,272 in 1831, and 130,061 in 1836.

(Malte-Brun, *Géographie*; Dupin, *Forces Productives, &c. de la France*; *Dictionnaire Géographique Universel*.)

VALENS, FLA'VIUS, emperor of Constantinople, reigned from A.D. 364 to 378. He was a brother of Flavius Valentinian, who, after being proclaimed emperor in A.D. 364, made Valens his colleague, and gave to him the government of the Eastern empire, and Constantinople as his capital. The year after his accession, while he was staying at Caesarea in Syria, he received intelligence of a rebellion, which was headed by Procopius, a Cilician, who assumed the purple at Constantinople. Valens himself was in despair at the news, and would have resigned himself to his fate, but the courage and resolution of his generals saved him; and in the two engagements of Thyatira and Nacosia, Procopius was deserted by his troops and conducted by some of his own followers to the camp of the enemy, where he was immediately beheaded, A.D. 366. The year after this victory Valens marched with an army across the Danube against the Goths, who had supported the usurper Procopius. During the war which now ensued, and lasted for upwards of two years, the Goths acted on the defensive. In the third year the Goths suffered a great defeat, and Athanaric, the judge of the Visigoths sued for peace and obtained it, A.D. 369. Valens returned to Constantinople in triumph. About the same time he was threatened with a war by Persia, but he confined himself to the protection of Armenia, without letting matters come to an open war. His empire now enjoyed peace for several years, during which some wise regulations in the administration and legislation were made. In A.D. 375 his brother Valentinian died, and Valens was thus deprived of a wise adviser at a time when he was most in need of him. In the year following the Huns entered Europe from Asia, and after having subdued the Alani, pressed upon the Goths north of the Danube, some of whom were likewise subdued. About 200,000 Visigoths took refuge in the Roman territory as suppliants, and obtained permission to settle in it. They were soon followed by hosts of Geuthrungi, or Ostrogoths, who crossed the Danube without having asked the permission of the Romans. The Goths soon found themselves exposed to all kinds of vexations from the Roman officers: in consequence of which a part of them, headed by Fritigern, took up arms, defeated the Romans near Marcianopolis, and began ravaging the country. Valens had been staying during the last years at Antioch, watching the proceedings of the Persians, and was still there when these events occurred. Two generals whom he sent to Pannonia were unable to effect anything against the Goths. Fritigern secured the assistance of the cavalry of the Huns and the Alani, and at last Valens himself hastened with an army of veterans from Syria against the Goths. A slight advantage gained by his general Sebastianus emboldened him so much that he hastened to fight a decisive battle in the neighbourhood of Adrianople before the emperor of the West could come to his assistance. The victory of the Goths on that memorable day in A.D. 378 was so complete, that scarcely the third part of the Roman army escaped. Valens himself was wounded and carried to his tent, which, according to some accounts, was set on fire by the barbarians, and the emperor ended his life in the flames.

Valens, who at the time of his elevation was in his thirty-sixth year, was a man of a passionate and also of a cruel character, and always lent a ready ear to informers. Most of the noble acts of his reign, such as his legislative measures, the establishment of schools, and the reduction of taxes, were owing partly to the influence of his brother, to whom he was sincerely attached, and partly to the wisdom and virtue of his præfect Sallust. During the first year of his reign he imitated the toleration of his brother; but after he had received baptism at the hands of the Arian bishop Eudoxus, he adopted his theological views, and persecuted those who differed from him.

Coin of Valens.
British Museum. Actual size.

(Ammianus Marcellinus, xxvi.-xxxi.; Aurelius Victor, *Epitome*, 46; Orosius, vii. 32; Sozomen, vi. 8: compare Gibbon, *Decline and Fall*, chaps. 25, 26.)

VALENTIN, MOÏSE, a French painter of great ability, born at Coulomiers, in Brie, in 1600. Writers differ as to the Christian name of Valentin; some call him Moses, and others Peter. He was first educated in the school of Vouet; he afterwards visited Italy, and adopted the style of Michel Angelo Caravaggio, in which he painted several admirable pictures, and he became one of the best of the *naturalisti*, or followers of Caravaggio, at Rome, although he died in 1632, aged only thirty-two. Valentin died of a fever in consequence of taking a cold bath on a hot summer's evening, after smoking and drinking wine to excess. Cardinal Francesco Barberini, nephew of Pope Urban VIII., was a great patron to Valentin, and employed him to paint several pictures for him, a Death of John the Baptist, and others: it was also through his interest that Valentin was commissioned to paint an altar-piece for St. Peter's, of the Martyrdom of SS. Processo and Martiniano. There is also in the Corsini palace an excellent picture by him of the Denial by Peter. He did not often paint religious subjects: his favourite pictures were scenes from common life, as soldiers playing at cards, fortune-tellers, concerts, and tavern scenes, &c. He painted with ease and rapidity, generally from nature, had a light touch, and coloured well and forcibly, but his drawing is often incorrect, and his forms are vulgar. There are eleven pieces by Valentin in the Louvre at Paris, but his works are not numerous: several of them have been engraved. N. Poussin and Valentin were contemporaries at Rome, and were great friends.

(Baglione, *Vite de' Pittori*, &c.; D'Argenville, *Abrégé de la Vie des plus fameux Peintres*.)

VALENTINIAN I., FLA'VIUS, a Roman emperor, who reigned from A.D. 364 to A.D. 375. He was a son of count Gratian, and a native of Cibalis in Pannonia. He distinguished himself as a gallant warrior in various campaigns; his mind was uncorrupted by the sophistries of the age, and his body was strong and healthy. After the death of Jovian in A.D. 364, Valentinian, then at the age of 43, was proclaimed emperor at Nicaea, although he himself was absent at Ancyra, and had never employed any means for the purpose of raising himself to that high station. Shortly after his accession he divided the empire between himself and his brother Valens, reserving for himself the western portion. [VALENS.] The frontiers of the empire were successively exposed to great danger during his reign. The Alemanni and Burgundians penetrated into Gaul from the east, the Franks from the north, and the Saxons made inroads from the sea. The Picts and Scots pressed forward from the north, and ravaged the province of Britain. Valentinian chose Paris as the central point for his operations against the barbarians, and through his general, Jovinus, he gained a great victory over the Alemanni in A.D. 366. The year following he was attacked by a dangerous illness, and on his recovery he raised his son Gratian to the rank of Augustus. Britain was in the meantime delivered from the inroads of the Picts and Scots by count Theodosius, who recovered the country as far as the wall of Antoninus. In A.D. 368 the Alemanni renewed their attacks upon eastern Gaul, and plundered Moguntiacum (Mainz); but Valentinian drove them back, crossed the Rhine, and defeated them in their own country, near Solicinum (Schmetzingen or Sulzbach), and as they retreated into their forests, the emperor recrossed the Rhine, and took up his residence at Treves. With the view of securing the eastern frontier of Gaul against further inroads of the neighbouring Germans, Valentinian built a line of fortifications along the banks of the Rhine, and a bridge of boats on the Rhine at Moguntiacum. Peace was also concluded with Macrianus, king of the Alemanni, and security on that side was for the present firmly established. The Saxons, in one of the predatory inroads on the coast of Gaul, were likewise defeated, and all who fell into the hands of the Romans were cut to pieces. After these victories and the establishment of peace, Valentinian celebrated a splendid triumph at Treves, and the orator Q. Aurelius Symmachus proclaimed the valour and enterprising spirit of the emperor. Theodosius, who after the recovery of Britain had been raised to the rank of magister equitum, was sent, in A.D. 372, into Africa, where Firmus had revolted and set himself up as an independent prince. Firmus was conquered by Theodosius, and reduced to such extremities that he put an end to his own life, A.D. 373. While peace was thus restored in Africa, the Quadi and Sarmatae rose in arms and invaded Pannonia. Valentinian himself set out from Treves at the head of his army, drove the barbarians across the Danube, and pursued them into Hungary. He ravaged the country, and put to death all the Quadi who fell into his hands. The barbarians, despairing of success, sent ambassadors to the emperor to sue for pardon and peace. Valentinian, who was staying at Bregetio when they arrived, poured out against them all his indignation. During this excitement he broke a blood-vessel and was choked, A.D. 375. Valentinian was a man of sober and temperate habits, and observed a general toleration towards persons of all creeds, without however entertaining any indifference or contempt for the Christian religion. But he was of a passionate character, which often led him to acts of cruelty. The condition of his subjects, and of Italy in particular, was greatly improved by his wise legislation.

(Ammian. Marcellin. xxvi.-xxx.; Zosimus, iii. 36, &c., iv. 1, &c.; S. Aurelius Victor, *Epitome*, 45: compare Gibbon, *Decline and Fall*, chap. 25.)

VALENTINIAN II., FLA'VIUS, also called Valentinian the Younger, was a son of Valentinian I. by his wife Justina, and was only four years old at the time when his father died. Gratian, who had been raised to the rank of Augustus in A.D. 367, succeeded Valentinian I. in A.D. 375, and made his brother, Valentinian the Younger, his colleague in the government of the empire, assigning to him the praefecture of Italy and the western part of Illyricum. His mother Justina was to reign in his name, until he should become of age. Gratian was greatly attached to young Valentinian, but his government was more nominal than real, since Gratian in fact governed the whole of the Western empire. The education of Valentinian was left to his other, who, being an Arian, endeavoured to instil the me opinions into the mind of her son. Their residence as st Milan, and when Justina requested the archbishop mbrose to assign a church for the use of herself and her n, that they might exercise divine worship according to e Arian forms, Ambrose strenuously refused to comply ith her request. This gave rise to tumults at Milan, in aich the life of the young emperor himself was endan- red. The court however was at last obliged to give way the archbishop; but an edict was promulgated in the me of the emperor, which granted the free exercise of ligion to all Christians, which again created great dis- rbances. [AMBROSE.] Maximus, who after the death Gratian, in A.D. 383, had been recognised as the lawful vereign of Gaul, Spain, and Britain, on condition that should leave Valentinian unmolested in the government Italy, was tempted by the religious disputes in Italy to ake himself master of that country also; and while he igned a faithful attachment to Valentinian, he invaded aly. The affrighted Justina fled with her two children, alentinian and Galla, to Thessalonica, to implore the pro- ction of Theodosius. The usurper was conquered, and alentinian was restored to his throne, A.D. 389. [THEO- SIUS.] Justina did not long survive this event, and after r death Valentinian gave up his Arian heresies, and us gained the attachment and admiration of his subjects. eace was thus restored in Italy, but another usurper arose Gaul. Count Arbogastes strove to gain the sovereignty the West. Valentinian allowed himself to be persuaded go to Gaul himself, A.D. 392. While staying at Vienne, the midst of his secret enemies, he ventured to oppose e arrogance of Arbogastes, and a few days afterwards, on e 15th of May, 392, he was found strangled in his own artment. His body was conveyed to Milan, and the fu- ral oration which Ambrose delivered over it is still ex- nt.

Coin of Valentinian II.
British Museum. Actual size.

(Paul. Diacon., ii.; Pomponius Laet. in *Valent.*; Oro- us, vii., 35; S. Aurelius Victor, *Epitome*, 48: compare ibbon, *Decline and Fall*, chap. 27.)

VALENTINIAN III., PLACI'DIUS, a Roman em- eror, son of Constantius by Galla Placidia. In A.D. 425, hen he was only a boy of six years, his uncle Theodosius I. raised him to the rank of Augustus, and assigned to m the western portion of the empire, which his mother lacidia was to govern in his name. She was little fit for ch a task, and the contemptible character which her son terwards displayed was probably the result of the dissolute anner in which she brought him up. Her two generals, ëtius and Bonifacius, who have justly been called the last f the Romans, might yet have saved the sinking empire ad they acted in concord, but the enmity between them astened its downfall. Gaul was constantly invaded by esh hosts of barbarians, but Aëtius compelled them to e for peace. Africa, where Bonifacius had the com- and, was lost, and fell into the hands of Genseric, king of e Vandals. In A.D. 437, Valentinian went to Constanti- ople, and married Eudoxia, the daughter of Theodosius II. d Eudocia. When he had reached the age at which he ight at least have taken a part in the administration of s empire, he passed his time in acts of wanton cruelty d debauchery, leaving the administration in the hands of s mother, and the conduct of the wars to his generals. fter the death of Theodosius II., in whose reign the East- n empire had been ravaged and ransacked by the Huns, ttila, their king, invaded Gaul and destroyed many of the ost flourishing cities. But in A.D. 451 they were defeated the plains of Châlons by Aëtius, and driven back across e Rhine. In the year following however they invaded y, and, as Aëtius had not sufficient troops to meet them decisive battle, the freedom of Italy was purchased by iliation and great sacrifices. The greatness of Aëtius d long nourished the secret envy and jealousy of the impotent Valentinian, and in A.D. 454 he assassinated him with his own hand. But the emperor himself did not long survive this atrocious act: on the 16th of March, 455, he was murdered by the patrician Petronius Maximus, whose wife had been violated by Valentinian, and who now usurped the throne of the West.

Coin of Valentinian III.
British Museum. Actual size.

(Paul. Diacon., v.; Pomponius Laet. in *Valent.*: compare Gibbon, *Decline and Fall*, chaps. 33 and 35.)

VALE'NZA, a town of Piedmont, in the province of Alessandria, situated on the right bank of the Po, in the district known by the name of Monferrato, and on the road from Alessandria to Casale. It is a fortified town, and has sustained several sieges. It has a communal college, several churches, and about 6000 inhabitants. (*Calendario Sardo.*)

VALERIAN. [VALERIANA.]

VALERIA'NA, a genus of plants, the type of the natural order Valerianaceæ. This name has a somewhat doubtful origin. Linnæus supposed, like *Gentiana*, *Eupatorium*, *Teucrium*, and other names, that it was derived from some distinguished individual of the name of Valerius; whilst Caspar, Bauhin, Ambrosinus, and others derive it from *valere*, on account of the medical virtues of some of the species.

The species of this genus are herbs or undershrubs, with very variable leaves, and mostly reddish-white corymbose flowers. The limb of the calyx is involute during flowering, but it at last unfolds itself in the form of a feathery pappus, which is seated on the inferior ovary. The corolla is infundibuliform, gibbous at the base, and 5-cleft. The stamens are 3, and the fruit is indehiscent, 1-celled, and 1-seeded. This genus presents many diversities of form, although its species are obviously closely related. Linnæus, in remarking on the want of constancy in the characters of this genus, under which he included the modern genera *Fedia* and *Valerianella*, observes, 'The calyx in some is a scarcely discernible border; in others 5-cleft. Tube of the corolla in some oblong; in a few furnished with a spur-shaped nectary: in others very short. Its limb in some equal; in others two-lipped, the upper lip divided. Stamens in several three; in some two; in others one or four; in some removed to a different flower from the pistil. Stigma in some 3-cleft; in others emarginate; in others globose. Pericarp, in some scarcely any; in others a thick capsule; in others of two cells. Seed sometimes crowned with feathery down, whose form is various; sometimes without any.' Nearly 100 species of Valeriana have been enumerated, of which 12 are European, and 4 are British. They are found in abundance in many districts both of the Old and New World.

V. officinalis, the Officinal or Great Wild Valerian, is a smooth erect plant with furrowed stems, with all the leaves pinnated, the leaflets being serrated and lanceolate, in 7 or 8 pairs with an odd one. The inflorescence is at first a corymb, but by growth becomes a panicle. The fruit is glabrous. This plant is a native of Europe, and by the sides of rivers and in ditches and moist woods is abundant in Great Britain. This plant was introduced into medicine, and admitted into the Pharmacopœia, on account of its being supposed to be the *Phu* (φοῦ) of Dioscorides. The *V. Phu* of Linnæus was afterwards supposed to be the genuine *Phu*, but Dr. Sibthorp discovered another species of Valerian in Greece, which Smith has named *V. Dioscoridis*, and which is probably the plant of Dioscorides. The root has a very strong smell, which is dependent on a volatile oil. It is very attractive to cats, and also to rats, and is employed by rat-catchers to decoy rats. It is much employed also in medicine at the present day. [VALERIANA OFFICINALIS —*Medical Properties of*.]

V. rubra, the Red Valerian, has ovate or lanceolate leaves, with a spur to the corolla half as long as the tube, and one stamen. This is a native of the south of Europe, the Levant, the north of Africa, and of Mount Vesuvius.

It is admitted into the English Flora on account of its being found occasionally wild; but as it is a very commonly cultivated plant, there is no reason to suppose that it is anything more than an outcast of gardens. This plant with four other species from the genus *Valeriana* have been made by De Candolle to form the genus *Centranthus*. The leaves have a glaucous aspect, and the flowers are of a dark-red colour. A variety is recorded with narrow leaves, and another with white flowers. The root of this plant has a sweet scent. This and the other species of Centranthus are elegant flowers for the garden, and may be easily propagated by seed: they will grow in any common soil or on rockwork.

V. dioica, the Small Marsh Valerian, is a glabrous erect plant, with a striated stem; the radical leaves ovate, undivided; those of the stem pinnatifid, with linear oblong leaflets; the stamens and pistils are on separate flowers in different plants, the corymbs of staminiferous flowers are loose, those of the pistilliferous flowers are contracted; the lobes of the stigma are almost united; the fruit is smooth. This plant is a deciduous herbaceous perennial, very common in moist meadows, by the sides of rivers, and in ditches throughout Europe. It is abundant in some parts of Great Britain. Its roots are often substituted for those of the *V. officinalis*, but they possess little medical value.

V. pyrenaica, the Pyrenean or Heart-leaved Valerian, has the corolla gibbous at the base, the leaves all pinnated, the leaflets lanceolate, nearly uniform and serrated. This plant is a native of the Pyrenees, but has been abundantly cultivated in British gardens. It is probably from this source that it has become to be a wild plant in Scotland, growing in woods about Glasgow and Edinburgh. Most of the Valerians, on account of the feathery nature of their calyx, may have their fruit conveyed to a distance, and thus germinate far from the spot where they were originally planted.

V. Dioscoridis, the antient Grecian Valerian, is an erect glabrous plant, with the lower leaves pinnated, and the leaflets toothed and ovate, the terminal one largest; the upper leaves with equal lanceolate toothed leaflets; inflorescence paniculate. This plant was first described by Smith, in the 'Flora Græca,' Dr. Sibthorp having discovered it near the river Limyrus in Lycia. Professor Edward Forbes, in his late visit to Lycia, met with this plant in great abundance over a large district. It is a deciduous perennial about two feet high, and is a very distinct species and typical of the genus. The *V. Italica* of Lamarck closely resembles this species, and Smith thought it might be the same. It is said to have four stamens.

V. Phu, the Garden Valerian, is an erect glabrous plant with square smooth stems; the root-leaves entire, oblong or elliptic; those of the stem pinnatifid, with oblong lobes; the corymbs panicled; lobes of the stigma 3; fruit smooth, except in two hairy lines. This plant is a native of Europe, in Belgium, Alsatia, Switzerland, Silesia, &c. It has a thick matted pale-green root. The flowers are white and give out a pleasant smell. It was supposed by Linnæus to be the antient *Phu*. *Phu* is the Arabic name of this species.

The preceding species are for the most part exclusively European: about 28 species have been described as inhabitants of the New World, resembling generally in structure and in properties the European species.

V. Celtica, Celtic Nard, or Nard Valerian, is a glabrous plant with entire obtuse leaves, the radical ones being obovate, those of the stem linear; the stems are simple; the flowers disposed in racemose spikes, and the fruit hairy. This plant is a native of France, Italy, Illyria, and Switzerland, in alpine districts. Its roots are sweet-scented and of a black colour. The roots of this plant are still imported into Egypt, for the purpose of perfuming the water used in baths. They very closely resemble in form and smell those of the Nardostachys, which there is every reason to believe yields the spikenard of the antients. [SPIKENARD.]

V. Hardwickii, Hardwick's Valerian, is an erect downy plant, with striated villous stems; root-leaves cordate, undivided, those of the stem sessile, remote, pinnate; corymbs at length panicled; stamens inclosed; fruit tetragonal, hairy; stigma 3-lobed. This plant is a native of Nepaul. It attains a height of about three feet. The root has a strong scent like the common Valerian, and is used by the Hindus in medicine in the same manner as the common Valerian in this country. This is the plant which Sir William Jones, in his 'Asiatic Researches,' supposed to yield the Spikenard, or Jatamansi of the Hindus. [SPIKENARD; VALERIANACEÆ.] There are about eight other species of Valerian natives of Asia, all of them having herbaceous stems, and with the peculiar aromatic property of the genus more or less developed.

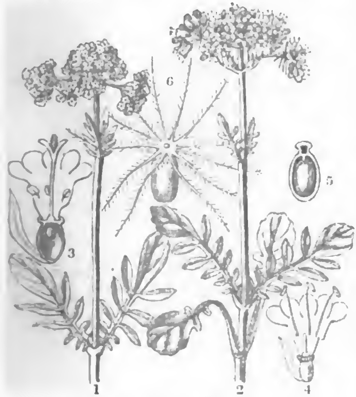
Many of the species of Valeriana are introduced into the garden, for which their ornamental flowers, easy culture, and hardy habits well adapt them. Those from warmer climates should be grown in pots, in order that they may be removed to the greenhouse during the winter months. Most of the species may be propagated by parting their roots and planting them out in the autumn or spring season where they are to grow; or they may be raised from seed sown at the same seasons and in the same situations.

(Don's Miller; *Cyc. of Plants;* Hooker's *British Flora;* Koch, *Flora Germanica.*)

VALERIA'NA OFFICINA'LIS—*Medical Properties of.* The root, or more properly the rhizoma with its root-fibres, of this species, particularly the variety termed *sylvestris*, is used in medicine. It should be collected in spring before it shows flower, or late in autumn. It is best from plants of two or three years old, which grow in elevated stony places, rather than in very moist meadows. It varies considerably in appearance and in its sensible properties, according to the age of the plant, its place of growth, and the length of time it has been kept. The rhizoma is small, short, rounded or oblong, truncated, furnished with very many root-fibres, which are about the thickness of a straw, and from two to six inches long. The colour of the freshly obtained root is a dirty yellowish-white; the consistence fleshy; by drying, which is easily effected, it becomes wrinkled, more yellow or brownish, and in time dark. The root gathered in spring becomes most wrinkled. The odour is heavy, penetrating, and very characteristic, and said to resemble that of the urine of cats. This odour is stronger in the dried than the fresh root, and is scarcely impaired by time, even when the access of the air is freely allowed. The taste is sweetish, aromatic, camphoraceous, and bitter. The English Valerian is the most esteemed: it is abundant in Kent and Essex, and the wild plant is to be preferred to that which is cultivated for medical use at Ashover in Derbyshire. It is to be regretted that this root is often confounded or fraudulently adulterated with that of the Valeriana dioica, which is smaller and of much feebler odour, and that of the Geum urbanum or *avens*, which is pleasantly aromatic. Much more serious is the confusion, probably always accidental or merely from ignorance, of the genuine root with those of several species of ranunculus, or crowfoot, viz. R. repens, acris, and even polyanthemos, also those of Sium angustifolium and S. latifolium, or more rarely Helleborus niger and Asclepias Vincetoxicum; but the absence of the peculiar odour of valerian, or the presence of a very repulsive one, may always distinguish them with moderate attention.

According to the analysis of Trommsdorf (*Journal der Pharmacie*, xviii., p. 3), 100 parts of the dried root yield of volatile oil 1·2, peculiar resinous extractive 12·5, gummy extractive 9·4, soft resin 6·2, woody fibre 70·7; by distillation a volatile fatty acid termed valerianic acid is obtained besides the volatile oil. The medicinal action is chiefly due to the volatile oil and extractive. Valerian is considered a *cerebro-spinal* stimulant, large doses of it causing marked excitement of the nervous system, not only of the human race, but also of cats, which are remarkably fond of it. In the slighter forms of nervous diseases not dependent on any change of structure of the brain or spinal chord, valerian is of considerable utility. In several instances, especially if there be much acidity of stomach, its beneficial effects are increased by combination with ammonia. In other instances valerian (in powder) greatly heightens the tonic power of the *disulphate of quinia*, the absence of all aroma from which renders it inferior as a tonic to many of the other forms of administering bark. [CINCHONA.]

VALERIANA'CEÆ, a natural order of plants belonging to Lindley's Aggregose group of Monopetalous Exogens. The order is composed of annual or perennial herbs or undershrubs with opposite exstipulate leaves. All the perennial species have roots more or less strongly scented; the annual are mostly inodorous. The flowers are either cocymbose, panicled, or in heads: sometimes changing from one form into the other. The calyx is superior, the limb either membranous or forming a feathery pappus. The corolla is tubular, 3-6-lobed, regular or irregular, and sometimes spurred at the base. The stamens vary in number from 1 to 5, and are inserted into the tube of the corolla alternately with its lobes. The ovary is inferior and 1-celled, with sometimes 2 imperfect and aborted cells; the ovule is solitary and pendulous, the style simple, and from 1 to 3 stigmas. The embryo is straight and without albumen, with a superior radicle. These plants are most nearly allied to Dipsaceæ; from which they are distinguished by their looser inflorescence, sensible properties, want of albumen, and the absence of an involucellum. They are more remotely related to Rubiaceæ. They are natives of temperate climates or elevated positions in both the Old and New World. They are more abundant in the north of Asia, Europe, and South America, than in Africa or North America.



Valeriana dioica.

1, Cutting with pistilliferous flowers; 2, do. with staminiferous flowers; 3, section of pistilliferous flower with fertile cell; 4, section of staminiferous flower; 5, section of sterile cell; 6, fruit with permanent feathery calyx.

The principal uses of this order will be found referred o under the articles Valeriana; Valerianella; and Spikenard. The genus *Nardostachys* is known by the following characters:—the limb of the calyx 5-parted, with the lobes ovate-oblong, acute, slightly toothed; the corolla is regular and bearded in the throat; the stamens 4; the capsule 3-celled, surmounted by the lobes of the calyx. Of this genus there are two species, the *N. Jatamansi*, the spikenard, and the *N. grandiflora*. The former has a villous stem, downy leaves, of which the radical ones are lanceolate, whilst those of the stem are sublanceolate; he fascicles of flowers are opposite, pedunculate, and terminal. The smell of the roots of this plant, as well as of others of the order, is not at all agreeable to European aste, so much so that some have doubted as to whether his can be the true spikenard which was so valued as a perfume by the antients. Dr. Francis Hamilton says, 'As here can be no disputing about taste, I cannot take upon myself to say how far the encomiums bestowed on the spikenard are applicable to this valerian (Nardostachys), and the native women, no doubt, consider the smell very agreeable, because most of such as can afford it use oil impregnated with this root for perfuming their hair. All I can say is, that if this root is the spikenard of the Roman ladies, their lovers must have had a very different taste from the youth of modern Europe. Notwithstanding the objections that might be raised against the Jatamansi, on the ground that the perfume produced by its roots would not prove perhaps so grateful to our modern ladies, yet to the ladies of antient Rome it might have been highly grateful, as it is to those of Nepaul at the present day.'

The genus *Patrinia* was named by Jussieu after M. Patrin, a traveller and collector of plants in Siberia. It has the limb of the calyx truncate, very short; corolla regular, without any spur, and bluntly 5-lobed; four stamens; a 3-celled capsule. The flowers are corymbose, and of a golden yellow colour. *P. Sibirica* has a very strong-scented root; whilst the *P. ceratophylla*, an American species, has a root that is eaten by the Indians. The root of this plant has at first some of the smell of the order, but previous to being eaten by the Indians it is baked on heated stones, by which process it is converted into a soft and pulpy mass, which has a sweet taste, resembling that of treacle, and appears to be a wholesome article of diet. The process of heating expels the volatile oil that gives to all these roots their peculiar odour; and the starch that is left, which is similar to that in other roots, is nutritious. This plant is a native of the north-west of America, and on the west side of the Rocky Mountains.

VALERIANELLA, a genus of plants belonging to the natural order Valerianaceæ. This name is a diminutive of Valeriana, but was rejected by Smith, Hooker, and others, as not being in accordance with the Linnæan laws of nomenclature; and accordingly they have described its species under the Adansonian genus *Fedia*. De Candolle, Lindley, and other systematic botanists however still retain *Valerianella*, and confine the genus *Fedia* to a single species, the *F. cornucopiæ*.

Valerianella, as at present constituted, consists of annual herbs, with oblong or linear undivided toothed or pinnatifid leaves, and small white solitary or corymbose flowers. The limb of the calyx is toothed and permanent; corolla regular, 5-lobed; stamens 3; stigma nearly entire or trifid; fruit 3-celled, membranous, indehiscent.

This genus includes about twenty-five species. Their distinctions are not easily made out, on account of the variable character of the different parts of the plant. De Candolle has divided them into four subgenera, depending on differences existing between the structure of the fruit, which is sometimes 2-celled and sometimes 3-celled; but only one of the cells ever contains the seed. Varieties in the structure and form of the fertile and sterile cells are the foundation of De Candolle's subgenera. Koch, in his 'Flora Germanica,' divides the German and Swiss species, which are only eight in number, into four sections, depending principally on the structure of the calyx. Four of the species are British, belonging to three of De Candolle's subgenera.

V. olitoria, Common Corn-Salad, or Lamb's Lettuce, has globose, compressed, inflated, glabrous, oblique, 2-lobed fruit; the limb of the calyx almost wanting; the two sterile cells of the fruit in one produced by an incomplete dissepiment; the flowers capitate; leaves linear, and angles of stem scabrous. This plant is an annual, from four inches to a foot high. It is a native of Europe, in corn-fields and cultivated ground, and is found abundantly in such situations, especially in a light soil in Great Britain. In France and Germany it is much eaten as a salad, and is frequently cultivated for that purpose in this country. It attains a much greater size in gardens than in the fields. In France it is called *Mache salade de prêtre doucette*; and in Germany, *Acken-salat*. Its English name, Lamb's Lettuce, refers to its appearing at the time that lambs are dropped. The following directions are given for cultivating it by Don:—'It is raised from seed, of which a quarter of an ounce is sufficient for a bed four feet by five. To answer the common demand, two, at most three, sowings will be sufficient, viz. a principal sowing at the beginning or towards the middle of August; a secondary sowing early in September, to furnish together crops in winter and early spring; and a smaller sowing in spring, at the close of February or in the course of March, if the plants are required in continuation throughout that season, though they are apt to get rank-tasted in warm dry weather. If wanted throughout summer, sow once a month, and cut the crop quite young. Sow the seeds in any bed of common mellow earth, broad-cast, and rake in the seed. When the plants are up, thin them to two or three inches asunder, that they may have room to acquire some small stocky growth for gathering. For seed leave some plants in spring.' (Don's Miller, vol. iii.)

The other British species of the genus are *V. dentata*, Smooth Narrow-fruited Corn-Salad; *V. mixta*, Sharp

Rough-fruited Corn-Salad; *V. eriocarpa*, Blunt Rough-fruited Corn-Salad. All the species are innocuous, and may be eaten as salads.

VALERIANIC ACID, an acid obtained from valerian root by heating it in water as long as it reddens litmus. The liquid is afterwards neutralized at a gentle heat with magnesia or carbonate of soda, and the solution of the resulting salt is to be evaporated to dryness in a water-bath. The dry mass is to be mixed with a proper quantity of sulphuric acid diluted with half its weight of water; when the mixture is gently heated, valerianic acid is set free, and it separates in the state of an oily stratum; it is to be poured off and submitted to distillation, the receiver being changed as soon as the acid passes over unmixed with water.

According to Dumas and Stas, this acid may be prepared from the oil of potatoes by adding to it ten times its weight of a mixture of equal parts of the hydrates of potash and of lime, and heating the mixture to 342° Fahr. The mass is to be allowed to cool excluded from the air, then to be moistened with water, and to be mixed with a slight excess of diluted sulphuric acid and distilled: the product distilled is to be saturated with lime or soda, as already mentioned, and the resulting salt is to be decomposed by distillation with sulphuric or phosphoric acid.

Valerianic acid forms two hydrates. When it is separated from the aqueous solution of a valerianate by a stronger acid, it contains, according to Liebig, three atoms of water, of which two may be separated, by distillation, in the state of pure water, which afterwards becomes milky, and at last the colourless monohydrate passes over in distillation.

This monohydrate is oleaginous, very fluid, of an acid penetrating odour, like the valerian root; its taste is acrid and sharp with a sweetish after-taste; it produces a white spot on the tongue. It does not become solid at 4° Fahr.

According to Dumas and Stas, its density is 0·937, and it boils at 347° Fahr.; while Trommsdorf states its density to be 0·944, and that the terhydrate boils at about 270° Fahr. The monohydrate dissolves in 30 parts of water at about 53° Fahr.: it dissolves in all proportions in alcohol, æther, and crystallizable acetic acid; and sulphuric acid when heated carbonizes it; but nitric acid, whether cold or hot, appears to have no action upon it. It dissolves iodine and camphor.

Valerianic acid combines with bases to form salts, which are called *valerianates;* the potash and soda salts are very soluble, deliquescent, and crystallize with difficulty. The valerianates of lime and barytes are also very soluble, but they are crystallizable and unalterable in the air; the magnesian salt crystallizes in efflorescent needles. Several of the metallic oxides have been combined with this acid, but the resulting compounds are not of sufficient importance to require minute description.

Anhydrous valerianic acid is probably constituted of—

Ten equivalents of carbon	60
Nine equivalents of hydrogen	9
Three equivalents of oxygen	24
Equivalent	93

VALERIA'NUS, PU'BLIUS LICI'NIUS, a Roman emperor, who reigned from A.D. 253 till 260. He was a Roman by birth, and descended of a noble family. He rose gradually from one office to another, and at the time when Decius was carrying on the war against the Goths Valerian held a distinguished post in his armies. In A.D. 251, Decius, in his desire to revive the ancient political virtue of the Romans, conceived the idea of restoring the censorship, which had been extinct since the days of Titus and Vespasian. The election was left to the senate, and the senators unanimously elected Valerian as the most worthy. A speech in which the emperor Decius is said to have announced to Valerian his elevation to the censorship, and described to him the powers it conferred upon him, is preserved in Trebellius Pollio's history of Valerian (c. 2). Valerian urged his incapacity to perform the arduous duties of such an office; and while the negotiations were still going on, a new war with the Goths broke out, and the censorship of Valerian remained a mere title, as Decius and his generals had to use all their energy against the enemy. In A.D. 253, when Gallus was murdered by Æmilianus, Valerian had the command of the legions in Gaul and Germany, and with them he hastened to Italy to avenge the death of his sovereign. Æmilianus however was put to death by his own soldiers in the plains of Spoleto, before Valerian had time to strike a blow, and Valerian was called to the imperial throne by the unanimous voice of the Roman world. His mild and unblemished character, his prudence, experience, and learning, inspired both the senate and the people with confidence. The Roman empire was threatened at that time by formidable enemies on all sides, and required the emperor to be an energetic general as well as a wise ruler. Valerian, who on his accession was at least sixty years of age, immediately appointed his son Gallienus his colleague in the empire. This choice was very unhappy, for Gallienus was an effeminate and careless man, and the whole period of their joint reign was a series of calamities, interrupted only by one great victory of Postumus, a general of Gallienus over the Franks, in A.D, 256, while his master was revelling in the pleasures of his court at Treves. Some German tribes ravaged Gaul and Spain, while the Goths crossed the Danube and invaded the countries south of that river. At the same time, Sapor I., king of Persia, who had already made himself master of Armenia, disturbed the peace of the eastern provinces. Notwithstanding his advanced age, Valerian left the care of the northern provinces to his generals, and marched in person against the Persians. He crossed the Euphrates, and met his enemy in the neighbourhood of Edessa. The Romans were vanquished, and the treachery of Macrianus, the praefectus praetorio, delivered Valerian into the hands of Sapor, A.D. 260. The Roman soldiers laid down their arms, and Sapor himself filled the vacant throne of the empire with one Cyriades of Antioch, who received the acclamations of the army. In order to gain the favour of his conqueror, Valerian betrayed his own country, and conducted Sapor to Antioch; which was taken by surprise and destroyed, and Syria and Cilicia fell into the hands of the victor. But notwithstanding this Valerian was dragged about by Sapor as a slave, dressed in the imperial purple, and treated in the most humiliating manner. It is related that whenever Sapor mounted his horse, Valerian had to kneel down and serve as a stepping-stone to his master. Valerian soon sank under the weight of grief and shame: after his death his body was flayed, his skin was stuffed with straw, and set up in a temple in Persia as a monument of Sapor's victory.

Valerian deserves both the praise and censure which have been bestowed upon him: he was a well-meaning but feeble governor. In his conduct towards the Christians he was at first mild and tolerant, but during the latter half of his reign the influence of Macrianus, a zealous upholder of paganism, induced Valerian to begin as bitter a persecution of the Christians as that which had taken place in the reign of Decius.

Coin of Valerianus.

British Museum. Actual Size.

(Trebellius Pollio, *Valerianus;* S. Aurel. Victor, *Epitome*, c. 32; Eutropius, ix. 6; Zonaras, xii., p. 625; Eusebius, *Hist. Eccles.*, vii. 10: compare Gibbon, *History of the Decline and Fall*, c. x.)

VALE'RIUS A'NTIAS, QUINTUS, or Valerius of Antium, wrote Annals of Rome from the foundation of the city to about the time of Sulla, in forty-five books at least. Gellius (vii. 9) mentions the forty-fifth book. He is often cited by Livy; but Livy used his Annals with caution, and observes on his exaggerations in numbers.

VALE'RIUS FLACCUS. [FLACCUS, CAIUS VALERIUS.]

VALE'RIUS MA'XIMUS was, according to an anonymous Latin life of him, of a Patrician family, and of the Gens Valeria; on his mother's side he belonged, according to the same authority, to the Gens Fabia, and from these two families derived his name of Valerius Maximus. But this account of the origin of the name Maximus may be safely rejected. The anonymous Life states that Valerius Maximus spent his youth and part of his early man-hood in improving himself by education: he afterwards served in the army, and accompanied Sextus Pompeius to Asia. This last circumstance is confirmed by Valerius (ii. c. 6), in a passage in which he speaks of Sextus Pompeius and himself witnessing in the island of Ceos the death of an old woman, who, being weary of life, determined to *die by* poison, and invited Pompey to be present on the *occasion*. This Sextus Pompeius was consul in A.D. 14, *the year* in which Augustus died, and seems to have been afterwards proconsul of Asia, and to have had Valerius Maximus among his comites. Nothing more is known of Valerius.

Valerius Maximus is the author of a work in nine books, intitled 'Exemplorum Memorabilium Libri novem ad Tiberium Caesarem Augustum.' It is dedicated to the emperor Tiberius Caesar Augustus, who is eulogized as the patron of all virtues and the enemy of vice. It is concluded from a passage in the ninth book (c. 11) that this work was written after the downfall of Sejanus, who appears to be clearly pointed at in this passage, though his name is not mentioned. The work of Valerius consists of short stories and anecdotes, taken from various writers. The chapters into which each book is divided have their appropriate headings, under which the subdivisions of each chapter are arranged: such as (lib. i.) 'on religion,' 'on simulated religion,' 'on foreign religion rejected,' 'on auspices,' 'on omens,' 'on prodigies,' 'on dreams,' 'on miraculous things:' (lib. ix.), 'on luxury and lust,' 'on cruelty,' 'on anger and hatred,' and so on. Each head is illustrated by examples. This collection has some value, as the author has preserved many facts which would be otherwise unknown: but his want of judgment renders his statements doubtful when they cannot be confirmed by other authority. He was not critically acquainted with the history and constitution of his own country, and accordingly his work should be used with caution. A singular blunder of his is pointed out by Savigny (*Das Recht des Besitzes*, p. 175, 5th ed.). The style of Valerius Maximus is totally devoid of all merit: it falls so far below the best writers of his age, that some critics have, on this ground alone, in opposition to the evidence already given, assigned him to a much later period. Julius Paris, a writer of uncertain date, epitomized the work of Valerius; and this epitome, which has been published by Mai, varies somewhat from the present text of Valerius both as to matter and expression. There is also an epitome by Januarius Nepotianus; and another, which was made at the close of the fifteenth century, by J. Honorius.

There is appended to the work of Valerius in its present form a fragment of a work, intitled 'De Nominibus, Praenominibus, Cognominibus, Agnominibus,' which is on a different subject from the other nine books. It professes to be an epitome or compendium by the same Julius Paris. This is clearly an extract from some other work than that of Valerius Maximus, and it has been conjectured that it is an extract from the 'Annales' of Valerius of Antium; but on what this conjecture is founded is not clear.

The first edition of Valerius Maximus was printed at Strassburg about 1470. Subsequent editions are numerous. One of the best is by A. Torrenius, Leyden, 1726, 4to. Valerius Maximus has been translated into most European languages. There is an English version by Speed, London, 1678, 8vo. The epitome of Julius Paris was published by Mai, in his 'Scriptorum Veterum Nova Collectio,' Rome, 1828, 4to., vol. iii., which also contains the epitome of Januarius Nepotianus.

(Vossius, *De Historicis Latinis*; Baehr, *Geschichte der Römischen Literatur.*)

VALE'RIUS POPLI'COLA. [PUBLICOLA.]

VALE'RIUS PROBUS, MARCUS, a Roman grammarian, who was living in the time of Nero, was a native of Berytus in Syria. He served originally in the army, but afterwards betook himself to study. Having formed a taste for verbal criticism, he applied himself to the emendation of authors and to annotations on them. A short time before his death he made an emendation of the following passage of Sallust—'Satis eloquentiae, sapientiae parum;' in which he read 'loquentiae' for 'eloquentiae.' He was perfectly satisfied of the truth of this emendation, and gave a reason for it. (Gellius, i. 15.) According to Gellius, he also wrote on the accent of certain Punic words, and on the secret meaning of the letters or symbols in the Epistles of C. Julius Cæsar to C. Oppius and Balbus Cornelius. This Valerius Probus may be the grammarian of the same name who is often cited in the Scholia on Terence, and also the author of Scholia on Virgil's 'Georgics' and 'Bucolics.'

The work intitled 'De Interpretandis Notis Romanorum' is not that to which Gellius refers, for the work mentioned by Gellius was on secret writing, whereas this is on abbreviated writing, or stenography. There are several editions of this work. One of the best is by Lindebrog, Leyden, 1599, 8vo. The two books 'Institutionum Grammaticarum,' which bear the name of Valerius Probus, are also supposed to be by another and a later writer. They were edited by Lindemann, in his 'Corpus Grammaticorum Latinorum,' Leipzig, 1831, 4to.

(Suetonius, *De Illustribus Grammaticis*; Bähr, *Geschichte der Römischen Literatur.*)

VALE'RY-EN-CAUX, ST. [SEINE INFERIEURE.]

VALE'RY-SUR-SOMME, ST. [SOMME.]

VALE'SIUS. [VALOIS.]

VALETTA. [MALTA.]

VALLA, LORENZO, one of the most distinguished Latin scholars of the fifteenth century, was born at Rome, according to Drakenborch, in 1407, but according to others five years later. He was the son of an eminent lawyer, was educated at Rome, and became acquainted with the Greek language under the tuition of Aurispa. Owing to the troubles consequent upon the death of Pope Martin V. Valla withdrew from Rome, and was engaged for a time in teaching rhetoric at Pavia and Milan. In 1435 he went to Naples, where he continued the same occupation, and gained the friendship of King Alfonso I. of Naples. He is said to have instructed the king in the Latin language. Valla and Beccadelli used to read to the king during dinner the works of the antients, and especially Livy's Roman History, and to converse with the king about the subjects which were read. While at Naples, Valla began by his writings to show his talent as a critic and a scholar. The freedom with which he treated Livy, and the fearless manner in which he attacked historical and theological errors, drew upon him the enmity of contemporary scholars and theologians, for to doubt the accuracy of Livy's statements was regarded in those times as a kind of heresy. After having spent some years at Naples, he went to Rome, and became a canon of St. John in the Lateran. But his heresies endangered his safety; and after some time he was compelled, by the command of the pope, to quit Rome. Valla returned to Naples, where Alfonso, as before, gave him protection against his enemies, and in 1443 the king appointed him his private secretary. The number of his enemies, among whom we may mention Beccadelli, Facius, and Poggio, was increased by the bitterness with which Valla inveighed against them; and a theological dispute, in which he became involved at Naples, had the most serious consequences for him: he was summoned by the archbishop of Naples, before an assembly of all the clergy of the city, and condemned to be burnt alive. Valla evaded the execution by declaring that he believed everything which the church required, until Alfonso had time to rescue him. Poggio relates that he was scourged round a convent at Naples, and then expelled from Naples. This story is believed to be a malicious fabrication of Poggio; but however this may be, Valla left Naples and went to Rome to justify himself before the pope and the cardinals, and he succeeded so well that Pope Nicholas V. not only treated him with great distinction, but appointed him professor of rhetoric with a handsome salary. He was also restored to his place as canon of St. John in the Lateran, and was at last raised to the office of secretary to the pope. He died at Rome in 1457, or, according to others, in 1465, and was buried in the church of which he had been a canon, where his tombstone still remains. It had at one time been removed from the church, but Niebuhr discovered it and caused it to be restored.

Valla was the ablest Latin scholar of his time. He was the first who read the antient writers in a true critical spirit. He was also the first who pointed out inconsistencies in Livy, for which he was bitterly persecuted by Poggio and Morandus of Bologna. The controversies which were carried on between him and his antagonists are almost unequalled in the history of literature for their bitterness: they are full of the most vehement invectives and slanderous imputations. Valla's works are partly historical, partly controversial or critical: after his death, two collections of them were published, one at Venice in 1492, and a more complete one at Basel in 1540. Those works which deserve especial mention are his 'Elegantiae Sermonis Latini,' which has often been printed, and is still very useful; his 'Notae in Novum Testamentum, sive de Collatione Novi Testamenti,' in two books; and his Commentaries on Livy and Sallust. Valla also translated into Latin, the Fables of Æsop, Homer's Iliad, Thucydides, and Herodotus. The last translation was incomplete when he died, and was finished by Pontanus. His translations have been severely censured by modern critics for their carelessness and inaccuracy, but it must be borne in mind that many of their deficiencies may not have risen altogether from his imperfect knowledge of Greek or carelessness, but also from the bad manuscripts which he used.

The biography of Valla involves many difficulties, which partly arise from the false or exaggerated accounts of his enemies. A minute and critical history of the life of Valla is given by Drakenborch, in the seventh volume of his edition of Livy. Compare also Hodius, *De Graecis Illustribus*, p. 104, &c.; Vossius, *De Histor. Lat.*, p. 579, &c.; Fabricius, *Bibliotheca Latina Mediae et Infimae Ætat.*, under 'Valla,' where a complete list of his works is given; Bayle, *Dictionnaire Historique et Critique*, under 'Valla.'

VALLADOLI'D, a city of Spain, capital of the province of its name in Old Castile, 73 miles south-west of Burgos, and 100 miles north-west of Madrid: 41° 40′ N. lat., 4° 42′ W. long. The city stands in a plain bordered by limestone hills, at the confluence of the Pisuerga and the Esguéva. Its ancient name was Pintia; but the Arabs changed it into Belad Walíd, or the town of Walíd, after Walíd Ibn Hishám, the eleventh khalif of the race of Umeyyah, in whose time Spain was conquered by Tárik Ibn Zeyyád and Músa Ibn Nosseyr. The exact time at which Valladolid was recovered from the Moslems is not known; but it was probably taken with other cities of Castile early in the eleventh century. Philip III. having made it his constant residence, the city is full of sumptuous edifices and palaces, which, though now untenanted and falling to ruin, give it a very imposing aspect. The Plaça Mayor, or great square, and the streets built on porticoes leading to it, are the only parts of the city which present some animation; the rest looks miserable and deserted. The cathedral, an unfinished edifice, built by Juan de Herrera, the architect of the Escurial, at the expense of Philip II., who was a native of Valladolid, was intended to have been one of the most sumptuous in Spain; but, like many other similar buildings, it was never completed. The church and convent of the Benedictines, that of San Gregorio and Las Huelgas, are very handsome; but the college of San Pablo is without dispute the most remarkable edifice in Valladolid, from its general elegance and the exquisite finish of the bas-reliefs on its 'portada,' or frontispiece, which after a lapse of 300 years preserve all their freshness and beauty. The royal palace is also a very fine building of mixed architecture, but it suffered much during the Peninsular war. The chancilleria, or house where the court of justice holds its sessions, is a large and fine structure in the Tuscan order. Valladolid has a university, founded by Alonzo XI. in 1346: it was formerly celebrated for its school of jurisprudence, and continued to flourish till the end of the last century. Among the colleges were one for the Scotch and one for the English; they have since been blended into one, called Colegio de los Irlandéses. Valladolid has also an academy of the fine arts, which supports a school of painting and design, and possesses a fine collection of models in sculpture, architecture, and painting. Since the suppression of the convents, all the objects of art belonging to the various religious houses in the province have been collected in Valladolid, and a good museum of painting and sculpture has been formed. Among the sculptures are the works of Juan de Juni, Berruguete, Becerra, Tordesillas, and Gregorio Hernandez.

Valladolid was formerly an opulent commercial city; but since the loss of the Spanish colonies, its manufactures of woollen stuffs, hats, silk-ribands, linen and cotton yarn, paper, liquorice, pottery and earthenware, leather, &c. are now little more than sufficient for the supply of the town. Trade however has considerably increased of late by the opening of a canal which connects the Pisuerga with the river Douro, only 10 miles distant from Valladolid, and which is intended to go as far as Santander. The country round Valladolid produces white wine of good quality, madder, silk, olives, and corn. Coal is said to be abundant in the neighbourhood; but if so, no use is made of this valuable article. Valladolid is the see of a bishop, suffragan of the archbishopric of Burgos, the residence of a captain-general, gefe politico, or prefect, an intendente, and other public functionaries of the province. Columbus, the discoverer of America, died in this city on the 20th of May, 1506.

(Miñano, *Dicionario Geográfico*, vol. ix. pp. 204; Pons, *Viage de España*, vol. ix.)

VALLADOLID. [MEXICAN STATES.]

VALLA'RIS, a genus of plants of the natural family of Apocynaceæ, so called from *vallo*, 'to enclose,' in consequence of its being used for fences in Java. The genus is characterised by having a salver-shaped corol, of which the tube is naked and the limb 5-parted. Stamens 5, exserted; anthers adhering, filaments with a fleshy gibbosity at the apex. Hypogynous scales 5, combined at the base. Ovary 2-celled. Fruit of 2 follicles. Seeds furnished with a tuft of hairs at the umbilical end. The species consist of a few twining shrubs, which are found in China, the Indian islands, and the plains of India. Of these V. Pergulana, called Echites hircosa by Roxburgh, and common in the Indian Peninsula and Archipelago, is remarkable for its offensive, goat-like smell; while V. dichotoma, indigenous in the north-western provinces, is remarkable for its agreeable odour. Its leaves are employed there as poultices.

VALLE, PIETRO DELLA, surnamed Il Pellegrino, a traveller of the 17th century, was born at Rome on the 2nd of April, 1586. Possessed of an independent fortune, he spent his youth in literary pursuits; his verses procured him admission into the academy of the Umoristi. The expectation of a war created by the disturbances which followed the death of Henry IV., induced Della Valle to turn soldier. He does not appear however to have seen any land service at that time; and of a cruise which he made off the coasts of Barbary in a Spanish fleet in 1611, he says himself that they had only scuffles, not battles.

An unsuccessful love affair, in which he was engaged on his return to Rome, drove him to Naples to consult his friend Mario Schipano, about a project he had formed to visit the Holy Land. At Naples he took upon him the habit, and made a vow always to bear the name, of a pilgrim. He embarked at Venice on the 8th of June, 1614, and continued an unsettled traveller till 1626. He first bent his course to Constantinople, which he reached on the 15th of August; he remained there till the 25th of September, 1615. From Constantinople he proceeded by way of Rhodes and Alexandria to Cairo. Leaving Cairo on the 8th of March, 1616, he travelled by land to Aleppo and Bagdad, where he fell in love with Maani Giorida, a young Chaldean, a native of Mardin, whence her parents had been driven by the Kurds, and married her. Della Valle carried his wife into Persia, where he was favourably received by Shah Abbas. He remained in Persia six years (January, 1617, to January, 1623), during which time he visited, in the suite of the king, Ispahan, the Caspian provinces, and Azerbijan. He served in a war between Persia and the Porte, and endeavoured to procure some amelioration of the condition of Christians in Persia. In December, 1621, his wife died: he had her corpse embalmed, intending to carry it to Rome with him. In the beginning of 1623 he sailed from Gambroon to Surat: he remained in India till the close of 1624. He returned by Muscat to Basrah, traversed the desert to Aleppo, and visiting Cyprus, Malta, Sicily, and Naples by the way, he arrived at Rome on the 28th of March, 1626. Here Della Valle deposited the body of his wife in the tomb of his ancestors, on the 23rd of May, 1627: he pronounced a funeral oration over her, in the delivery of which he was interrupted by his tears. Some authors say that his audience sympathised with him; others that they laughed at him.

Urban VIII., to whom Della Valle presented a memoir on the condition of Georgia, appointed him an honorary gentleman of his bedchamber. Soon after he buried his first wife, Della Valle married a young relation of hers who had accompanied him on his travels. Having in a violent access of anger killed a coachman on the Place of St.

Peter, while the pope was in the act of pronouncing the enediction, Della Valle was banished from Rome, but *oon* obtained a pardon and leave to return. He died on he 20th of April, 1652.

Della Valle caused to be printed in 1627, but did not ublish, the oration which he pronounced over his wife's ody at the funeral ceremony. In 1628 he caused to be rinted at Venice an account of Shah Abbas, which Belori (1662) says was not published: a French translation of his work appeared at Paris in 1631. Della Valle published, in 1641, 'Di tre nuove Maniere di Verso sdrucciolo, iscorso di Pietro della Valle nell' Academia degli Umoisti il Fantastico, detta nella stessa, a' 20 di Novembre, 633.' In 1650 he published the first part of the letters ritten to his friend Schipano in the course of his travels: his first part was contained in one 4to. volume, and rought down the narrative to the time of his marriage ith Maani Gioerida. The letters relating to Persia were published after his death, in 1659, in two volumes: the third part—his Indian travels and his return to Rome—were published in 1662. This work has been translated into French, Dutch, and German; an English translation of the last part was published in 1665. The memoir on eorgia presented to Urban VIII. was inserted by Thévéot in the first volume of his collection. In 1644 Della alle composed a narrative of the adventures of his second ife, which does not appear ever to have been published. le also left in MS. an account, in Latin, of the kings or hiefs subject to Persia, and some plans and drawings, hich his widow refused to communicate for publication. ella Valle appears to have been rash and vain, but he ossessed the susceptibility to external impressions, reentive memory, and facility of expression, which is freuently found in persons of that character. His accounts f routes and distances, of the external appearance of counries, and of manners and customs, are lively and accurate.

(Pietro della Valle, *Viaggi descritti in Lettere familiare l suo amico Mario Schipano*: Bellori, *Life of Della alle*, prefixed to the edition of his Travels published at Rome in 1662; *Biographie Universelle*.)

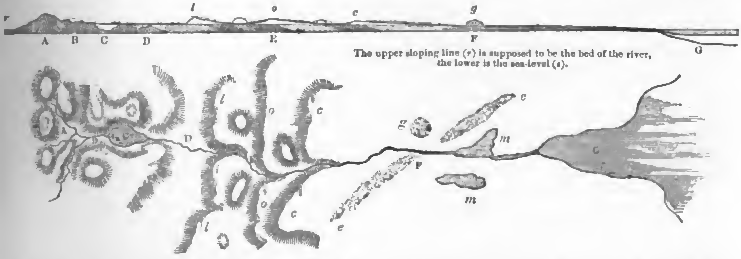
VALLEYS. 'Why has the earth any mountains?' is the question from which De Luc, writing in 1792, sets out to expound his whole geological system; and to answer at the present time the corresponding question, Why has the earth any Valleys? requires reference to almost the entire series of general truths which have been established by investigation into the structure of the crust of the globe. For in these hollows on the surfaces of plains, hilly slopes, and steep mountains, we behold not only the results of atmospheric agencies, both chemical and mechanical, and of the flowing of streams, operating under the actual conditions of nature on materials of unequal induration, but also the earlier effects of other watery agencies, under other physical conditions, on materials differently circumstanced, both as to their consolidation and their position in reference to the general curve of surface of the globe and the relative level of the sea. The origin of valleys ascends to the earliest geological æras, but their completion includes the latest phenomena produced in our own days.

To discuss the literary history of this celebrated question, and estimate the degrees of truth attained in the conflicting hypotheses of Dr. Hutton and De Luc—which may stand as the types of two great classes of rival speculations, not yet completely reconciled—would be a long, intricate, and unfruitful labour. The problem to be solved has seldom been seized by any but the most modern writers in all its generality; and the partial solutions, really arrived at in particular cases, were not permitted to have even the value which limited truths often do possess, because they were unwisely made the basis of what was called a general theory. Though De Luc could prove that valleys on whose line were deep lakes could not have been excavated by the streams now running in them, he was scarcely entitled to say that 'all the notions of the great ravages produced by the rain-waters upon our continents since their existence have been mere illusions.' (*Letter* I. *on Geology*.) And Dr. Hutton might have carried his pupils beyond the mechanical effects of 'rivulets that run only in time of rain,' before he required them to admit 'the great fact, that rivers have in general hollowed out their valleys.' (Playfair's *Illustrations of Huttonian Theory*, Note xvi.)

Theories thus supported were only successful in destroying each other: modern geology has been advanced by a very different process. Mr. Lyell, M. D'Halloy, Mr. Scrope, and other modern writers, have contributed similar partial solutions of particular cases, by careful investigation of the features of the valleys of Auvergne, Belgium, and the Rhenish provinces; but to obtain a general view of the theory of valleys, we must add to these many other equally established local results. This necessity is indeed virtually acknowledged by the eloquent writer to whom the Huttonian hypothesis owes its celebrity, for even while he declares the great hollow of the Valais to be the work of the Rhône, he adds, this tract, when the Alps rose out of the sea, may have included many depressions of the surface which the river joined together, and, from being a series of lakes, became one great valley.

To take the problem of the formation of valleys in all its extent, let us trace in imagination the course of a considerable river, which, commencing in a mountain-ridge, runs to the eastward, namely, in the direction of the dip of the strata, and, after traversing the usual variety of ground, empties itself into a shallow sea full of powerful currents.

A. The summit of drainage between one river area and another being supposed to be below the level of perpetual snows, we find, above the permanent sources of many rivers, occasional feeders, which depend on particular alls of rain, becoming dangerous torrents or appearing as mere lines of pebbles according to the state of the weather. After heavy rains the hill-sides of the highland districts of Scotland, Wales, and Cumberland are whitened by abundance of short-lived torrents, which hurry down considerable heaps of the loosened materials of the hills, and spread them into little deltas on the margin of the valley below. Similar effects on a particular slope follow the bursting of a waterspout (High Pike, in Cumberland) or the intumescence of a wet peat-bog (above Keighley, Yorkshire). Frost and the sun's heat are felt in extreme in the high regions which give birth to rivers, and by their alternation the rocks are broken and disintegrated. To these regions Hutton and Playfair rightly propose to carry their pupils for the purpose of impressing upon their minds the extensive waste produced on the earth's surface by modern causes in action. Examples are everywhere abundant; Glen Coe, Borrowdale, Snowdonia, may be



The upper sloping line (*r*) is supposed to be the bed of the river, the lower is the sea-level (*s*).

cited. (N.B. The *general* features of the higher parts of mountain-valleys are nearly the same around glaciers, and these features are liable to change by the violent alternations of temperature.)

B. The second stage of valleys is that which admits of the union of permanent natural springs to the occasional hill-side floods, and of the gathering of these streamlets into a rapid and agitated river. The now augmented water is often confined in a narrower glen than any of its tributaries, and rushes and cascades among rocks and mounds, which are so disposed as to show proof that the course of the stream has varied from time to time, as the levels changed, in consequence of eroding action.

C. At length the glen opens in a pebbly plain, or sinks into a broad and quiet lake. Such lakes, or plains which seem to have been lakes, are of very general occurrence along the line of rivers, while they are engaged in the midst of their parent mountains (Derwent Water, Llanberis, Loch Tay). They even appear at the foot of particular mountains, receiving only occasional streams (Red Tarn, under Helvellyn), and in a great variety of cases appear to be irregular hollows left after great disturbances of the stratification amongst the angularly posited masses of broken ground. Their depth is from a few feet to a thousand feet (Lake of Geneva) below the level of the valley; and as the rivers which enter the upper ends there lose their force in the expansion of water, and drop their transported sediments, the *growth of new land* in that part of such lakes is proportioned to, and is in truth a measure of, the whole effects of those rivers in transporting away the detritus of the mountains round their source. Such lakes then are *natural dynamometers*, which may with proper caution be used to determine the amount of transported materials delivered into them in given times by rivers; they also give the sum of all the effects of this kind performed by such rivers; and thus finally they are *natural chronometers:* for by dividing, in any particular case, the integral effect or mass of deposited materials by the rate of annual progress, an approximate answer in years is given to the question of the length of time which has elapsed since that river began to flow. By this argument De Luc arrived at the conclusion that the desiccation of our continents by elevation above the sea is a phenomenon of no very great antiquity, belonging to an epoch only a few thousand years removed from our own. Though geologists cannot, from the evidence of particular lakes in certain districts, adopt this conclusion for other districts where quite different phenomena appear, Professor Sedgwick and other eminent persons have declared the argument of De Luc, within its proper limits, to be unanswered and unanswerable. In all cases then where lakes are so interposed in the path of a river that they must be believed to have received all the sediments which that river has brought, the cubic volume of these accumulations in the lake may be compared with the cubic space of the concavities between the hills along the line of the rivers and rivulets above the lake; and if found to be inferior in a noteable degree, we may positively conclude that these concavities have not been produced, though doubtless they have been enlarged and modified, by the atmospheric agencies belonging to that particular area of drainage. Now this comparison has been often made, and generally with the positive result, that the excavation of the valleys above the lakes is not the effect of those watery agencies now exerted within them. Excavated however some of them have been by watery agency, and in all of them the surface slopes have been adjusted by this power, both in level and in direction, to the boundaries of the present lake; but we must avoid the error of assuming that no other currents having a different origin may have operated in those valleys before the existence of the lakes.

D. Beyond the region of the lakes, the rivers, flowing away from the rugged mountains, encounter ranges of stratified rocks, often very regularly inclined at a moderate angle, in parallel ridges and hollows which correspond to alternately hard and soft portions of the series of strata. If there were no gaps across these ridges, so as to connect their intervening hollows, each of these hollows would include one or many lakes, and the river whose course we are tracing could not pass over the first of the ridges until the hollow space between it and the lake district (C) was filled with water, generally at a high level. If such a circumstance were supposed ever to have happened, the waters might be imagined to make themselves a passage across this ridge, and, by like reasoning, across any ridges lying beyond. (See the figures, art. Geology, ii., p. 145, and those in page 97.)

It sometimes happens that more than one group of parallel ridges and hollows—as the mountain limestone group (*l*), followed by the oolitic ridges (*o*), or those of the chalk-hills (*c*)—lie on the course of even one river, and require the repetition of such phenomena to account for the course of the valley. But a greater difficulty must be encountered. The very hollows themselves in which these sheets of water are imagined to have spread are valleys, and yield as plain proof that they also have been excavated and modified by watery action, as the narrow channels which cross them. For in the midst of such hollows, insulated hills (the unremoved portions of the same or the nearest superjacent strata) remain variously distributed, to mark the antient height of the land thereabouts, attest the enormous degradation which has been there occasioned. If then the supposed lake gave the force to break over and cut through the enclosing barrier of strata beyond, so as to shape a course and descent to the river, the excavation of the space in which the lake was gathered was the fruit of earlier and different watery action. This conclusion is again and again forced upon our attention as we proceed along the line of the valley.

E. In crossing through the parallel ridges and hollows of hard and soft strata, the river is confined to steep, narrow, angularly bent passages among the hard rocks; but in the softer strata between them it flows and winds more at liberty, through wider spaces, which open far on each side, and bring additional supplies of water. In these hollows the velocity of the stream dies away, and the sediments derived from wasting of the adjoining high grounds fall on fertile meadows in floods or silt up their own channels in times of slack-water, while around appear insulated hills, left by the antient water-currents which swept away the materials around them.

F. The river on emerging from these ranges of secondary strata enters a wide region of plains and low hills of gravel (*g*), rising irregularly amidst alluvial plains and marshes (*m*), amongst which, for a certain distance, the tide flows up the expanded river-channel.

Wherever these marshy plains and gravelly ridges are locally related by geographical situation and distribution to the main stream or smaller branches, so as to allow of the possibility of referring their formation to the action of the existing fluviatile and tidal currents, it would be false philosophy to look for a more remote or more general cause. This is often the case, perhaps generally so, with the alluvial sediments, for they contain often freshwater shells and other marks of limited lacustrine or fluviatile action: but it is seldom the case with the gravel beds and ridges. These often lie across the path of the river, and often rise to a great height above it; often consist of stones not only beyond the present power of the river to transport, but such as do not occur *in situ* in any part of the area drained by its main stream or tributary waters.

Yet, from their form, distribution, and composition, there is no doubt that some have been wholly accumulated and all modified by water-currents: so that here again we have proof of the waste and remodelling of the surface of the earth by other forces than the existing atmospheric agencies.

G. On reaching the sea, we find the influence of the river prolonged into the salt-water: augmenting the mass of sediments drifted coastwise by the tide, and feebly assisting in the distribution of them. But the bed of the sea is unequal, soft, or rocky, excavated into hollows, and varied by sand-banks and gravel-beds, not unlike those on the neighbouring land, and even yielding, as they do, bones of gigantic extinct mammalia (Happisburgh coast). These points of agreement between the actual sea-bed and the neighbouring lands mark some community of origin: the land has been raised out of the sea, and owes some of its irregularities to marine currents (as Buffon thought), or the sea's bed is subsided land. Each of these may be partially and locally true, but there can be no doubt of the sea-currents having power to alter the distribution of sand-banks and gravel-banks to some considerable, though not precisely known, depth; and as all the stratified crust of the earth has been once the bed of the sea, it is evident that the action of marine currents is a cause of universal applito the theory of the inequalities of the earth's sur- as well as of extraordinary power.

e slight sketch here presented includes phenomena h may be seen on the English rivers, though not all ne and the same stream: the description may be veri- in every one of its stages a hundred times, and aug- ted with additional phenomena by any intelligent er personally acquainted with the physical geography ritain. Exactly similar phenomena, either all in the e order or variously associated, may be paralleled by ances selected from other parts of the world, and it only ains to apply a plain course of reasoning to them.

he action of atmospheric agencies, river-streamlets, rivers, with or without lakes, with or without glaciers, ways one and the same: to degrade the high lands to raise the low, and thus to equalize the levels, and iminish the irregularities of the surface of the globe; this because of the universal action of gravity, where- r there are weighty masses and inequality of level. The 's action is similar, and though complicated by tidal tuations, as rivers and lakes are by droughts and innn- ions, and by the variable influence of wind and tem- ature, its final results are of the same character.

This is indisputable. It is equally true that the direction he existing watery agencies on the land is determined the present relation of levels between the different ts of the land, and between the land and the sea. More- r the effects of these agencies are perfectly adjusted to se levels. It follows inevitably that the sum of the ects of these existing agencies has been to diminish the ginal inequalities of the earth's surface, that is to say, to er the hills, to smooth and level the valleys, to fill up lakes, which are a part of the valleys; in a word, to nge gulfs into lakes, and chasms into vales, by a mere face action on forms which had been more boldly marked earlier æras of nature.

We must therefore believe that immediately after the iccation of the land, its grand chains of mountains and g continuous vales were more firmly outlined, more ghly and strongly modelled, deeper and higher than they w appear, and it only remains to inquire to what known ological causes this can be justly ascribed.

We must remember, first, that the surfaces of stratifica- n on the sea's bed were once continuous, but on the land ey are now interrupted by excavated valleys and left membered on residual hills: secondly, that these sur- es were plains or nearly so, and horizontal or nearly ; but now they are found contorted, ruptured, placed angular positions, vertical, or even reversed in par- ular regions. The latter class of effects depends on violent nature of the elevating movements to which e land was subject; the former is often independent local disturbance, and seems to be due to the mere tion of powerful currents of water. But it is often en that the line of these valleys is the line of a fault, a synclinal basin, or anticlinal ridge, that is to say, *a ne of weakness*, a line of least resistance, determined causes anterior to the current of water which, flowing or down the line, or both up and down, has worn it into valley.

Now if we remember that the most powerful mechanical tion of water takes place on the seacoast; if we remem- r that, by the continual or the periodical rising of the nd, this littoral action has been transferred from point to oint over every part of the area of the land, beginning mong the mountains at the source of the present rivers, d successively washing and wasting every part; we shall adily admit in this one universal and powerful agency e principal cause which broke the continuity of the lanes of strata, washed away the least resisting and left e hardest parts, and, by successively retiring lines of ction, gradually completed the main features of the val- ys and hills which had not been previously impressed violent subterranean movements.

Atmospheric agencies must be admitted to have greatly o-operated in this result, especially if, as geologists sup- ose, there were grounds for believing these to have been ore powerful in the earlier æras of the world, when the mperature was perhaps higher and the atmosphere in onsequence more highly vaporous. Nor must we under- alue the eroding power of modern streams, or the volume f the disintegrated earthy masses which they transport way. It is past a question that modern rivers have cut their own channels through lava (Lyell, *Principles of Geol.*, vol. i.), through diluvial gravel and clay drifted from other regions (Phillips, *Sections of the Yorkshire Coast*), and through trap thrown up by the Eifel volcanoes (MS. 1829). But in each of these latter instances the valley of diluvial gravel and clay lies in and conceals in part an *older valley* of ruder aspect, excavated in the stratified rocks of sandstone or limestone or argillaceous slate; and we may often contemplate in the course of one stream the fragmentary state of the rocks as left by elevatory forces, the wasting of these when they formed part of an antient shore, the obliteration of the old valleys by some yet ill-understood cause of local accumulation, and the final adjustment of levels and slopes by causes which are still continuing this beneficent process, enlarging and enriching our meadows, contracting the areas of our lakes, and softening for the future wants of mankind the rugged features of hills which will not always defy the hand of industry.

(The reader who desires to follow out this large subject may consult with great advantage De Luc's works—as, *Letters on Geology*; *Lettres sur l'Hist. de la Terre et de l'Homme*; Playfair, *Illustrations of Huttonian Theory*; Buckland's *Reliquiæ Diluvianæ*; Lyell; Murchison; Darwin; and other modern writers. The article PARALLEL ROADS in this work may also be read: M. Agassiz's *Speculations on Glaciers* have several points of important bearing on the subject of Valleys.)

VALLIE'VO. [SERVIA.]

VALLISNE'RI, or VALISNIE'RI, ANTO'NIO, an Italian naturalist, was born on May the 3rd, 1661, at the castle of Tresilico, of which his father was governor. He received his early education from the Jesuits at Modena, and by them was instructed in the philosophy and science of the schools of the day. In 1613 he repaired to Bologna,* where he studied medicine under the celebrated Malpighi, and acquired from him a taste for the observation of nature, as well as an impression of the unsoundness of the prevailing systems of philosophy and science. In 1614 he graduated at Reggio, but again returned to Bologna, to pursue his natural-history studies under Malpighi, who after three more years of application, is said to have dismissed his pupil in these words: 'Systems are ideal and mutable. Observation and experience are solid and unchangeable.' He visited Padua, Venice, and Parma, and in 1688 commenced the practice of a physician in Reggio. Here he devoted all his leisure to the study of nature: he planted a botanic garden, made collections of plants, minerals, and objects of interest in his neighbourhood, and commenced a series of observations on the anatomy of the silkworm, from which he was led to the study generally of the metamorphoses and generation of insects. Having published his observations, they acquired him great reputation, and he was invited to occupy a chair amongst the medical professors of the University of Padua in 1700. On taking his position amongst the teachers of an old university, he felt that his views were opposed to prevailing systems, and in order to prevent any alarm at his teaching, he published a lecture in which he endeavoured to maintain the position that the studies of the moderns do not overturn, but confirm the medical knowledge of the antients. Notwithstanding this attempt to appease the advocates of old systems, and of entire obedience to prescribed authority, Vallisneri attacked with so much energy the prevailing errors in medicine, and especially in the sciences of anatomy and physiology, that he met with much opposition. But he found an able protector in Frederic Marcello, the procurator of St. Mark, and in 1711 was appointed to the first chair of the theory of medicine.

During the interval of his lectures Vallisneri took every opportunity of studying natural history, and for this purpose made an excursion to the Apennines, and also visited Lucca, Pisa, Leghorn, Florence, and other parts of Italy. In these excursions he made considerable collections of objects in natural history, as well as found many subjects of interesting research for the microscope, which he used with great success. In 1720 he was invited by Pope Clement XI. to become physician to his holiness in the place of the celebrated Lancisi, but he refused. In 1728 the duke of Modena presented him with the order of knighthood, which was to be hereditary in his family. He was also invited early in his career to become first professor of physic at Turin, with a large salary, which he declined. He was known by his writings and correspondence to men of science in Great Britain, and was elected a fellow of the Royal Society of London. He was married in 1692, and although his wife produced him eighteen children, she managed his family with so much good sense and prudence, that he was always in easy circumstances, and enjoyed much domestic felicity. He died on the 12th January, 1730, and was buried in the church of the Eremitani at Padua. He left behind him only four of his numerous family, three daughters and one son, who published an edition of his father's works, in three folio volumes, at Venice, in 1733.

Vallisneri deservedly ranks high as a naturalist and a physician. He published many papers on the various departments of natural history, in which he pointed out the necessity of observation of external nature before proceeding to generalization. He did much by his anatomical and physiological inquiries, in conjunction with the labours of Malpighi, Redi, and others, to rescue medicine from the thraldom of received opinions, and to upset the absurd hypotheses of the functions of the animal economy which prevailed in his day. He was a great opponent of the doctrine of equivocal or spontaneous generation, a notion that was generally entertained by physiologists of that day, and which then, as now, was often looked upon as involving consequences opposed to religious truth. His contributions to botany were not numerous; but his catalogue of plants collected around Leghorn was a valuable production of its time, and his paper on the fructification of *Lemna* was an important addition to existing knowledge of the structure of a very obscure and interesting tribe of plants. As a physician he was a judicious observer of the effects of remedies in relieving disease, and was among the first to use Peruvian bark: he published several essays on the action of this and other medicines on the human economy. His name is perpetuated in that of a curious and interesting genus of plants, called by Micheli *Vallisneria*. (Bischoff, *Lehrbuch der Botanik;* Haller, *Bib. Bot.;* Sir J. E. Smith.)

VALLISNE'RIA, a genus of plants, named by Micheli in honour of Vallisneri [VALLISNERI], belonging to the natural order Hydrocharaceæ. The species of this genus are all water-plants. They are diœcious: the male flowers are seated on a spadix; the corolla is monopetalous with three segments. The female flowers are included singly in a spathe, and are seated upon a spiral peduncle; the calyx is composed of a single leaf; the corolla is polypetalous; the capsules are 1-celled, many-seeded; the seeds parietal. Several species of Vallisneria have been recorded as growing in Europe, New Holland, and America. The economy of these plants is exceedingly interesting in a physiological point of view. They are plants growing at the bottom of the water, and yet the male and female flowers are separated, and the mode by which they are brought together affords a singular instance of adaptation. These plants generally grow in running waters, and thus render the difficulty of the contact of their flowers greater. The mode by which this is effected in the *Vallisneria spiralis* is as follows:—the flowers with pistils are seated on spiral flower-stalks, and when the flower is expanded it floats on the surface of the water, and this is always secured, even in the waters of rivers that are very changeable in their height, by the lengthening and contraction of the spiral stalk on which the flowers are seated. On the other hand, the flowers with stamens are seated on short peduncles at the bottom of the water, but when their stamens are ready to shed their pollen, and the pistil is ready to receive its influence, the peduncle that holds them then gives way, and they are floated to the surface of the water, where, coming in contact with the pistilliferous flowers, the function of impregnation is effected. When the seeds have become developed, the spiral peduncle on which the fruit is now seated coils entirely up, so that the seeds are brought to the bottom of the water, in a position in which they can germinate and produce new plants. The *V. spiralis* is found in Italy, in ditches near Pisa, and in the Rhône. There are two New Holland species, and also an American and East Indian species. The latter is the *Hydrillus* of Dr. Hamilton, and is used in Hindustan under the name of Jangi, for the purpose of supplying water mechanically to sugar during the process of refining.

VALMIKI. [SANSCRIT LANGUAGE AND LITERATURE

VALMONT DE BOMARE, J. C., was born at Rouen in September, 1731. He originally studied the law for the purpose of practising at the bar, but his attachment to natural history induced him to abandon a profession so foreign to his tastes. Having obtained from the Duke d'Argenson a travelling appointment of some kind, he visited the principal cities of Europe, and examined with great care the various museums of objects in natural history which they contained. He took an especial interest in mineralogy, and visited mines and metallurgic establishments for the purpose of increasing his knowledge in that department of science. During his travels, of which he published an account, he visited Lapland and Iceland, and returned, laden with objects of natural history, to Paris in 1756. In 1758 he published a list of objects in natural history, under the title 'Catalogue d'un Cabinet d'Histoire Naturelle,' 12mo. In 1761 and 1762 he published a large work on minerals generally, in 2 vols. 8vo., entitled 'Nouvelle Exposition du Règne Mineral.' His greatest work was a dictionary of natural history, entitled 'Dictionnaire Raisonné Universel d'Histoire Naturelle,' in 6 vols. [illegible] This work was one of very considerable merit, and gives descriptions of the various objects in the three kingdoms of nature, and of their uses in the economy of the arts. It has gone through a great number of editions, printed at various places, and is the basis of more modern dictionaries on the same subject. He gave courses of lectures on natural history in Paris from 1756 to 1788. He had offers to accept chairs of natural history in Russia and Portugal, but refused. He died at Paris, in August, 1807. (Haller, *Bib. Bot.;* Sir J. E. Smith.)

VALOGNES. [MANCHE.]

VALOIS, LE, a province of France, belonging originally to Picardie, but incorporated in the military government of the Ile de France. Its capital was Crépy: it is now included in the departments of Oise and Aisne. Le Valois constituted a county in the middle ages, and was held by a younger branch of the family of Vermandois. It was united for a time with the counties of Vexin, of Bar-sur-Aube, and of Amiens, and with several lordships, which made the counts of Valois rank with the most powerful and richest of the French nobles. On the abdication of Simon, count of Valois (A.D. 1077), these territories were separated, and the county of Valois united to that of Vermandois. [VERMANDOIS.]

Philippe III. le Hardi, king of France, gave the county of Valois (A.D. 1285) as an apanage to his second son Charles, whose son became king of France as Philippe VI. or Philippe de Valois. His title was disputed by Edward III. of England, among others; and from this dispute originated the long wars of the English in France under the Plantagenet and Lancastrian kings. Philippe VI. bestowed the county of Valois on his fifth son Philippe; from him it came to his wife Blanche, and on her death (A.D. [illegible]) it came to Louis, duke of Orléans, second son of Charles V. of France. While held by the dukes of Orléans, the descendants of Louis, the county of Valois was raised to the rank of a duchy. The accession of the duke of Orléans to the crown as Louis XII. re-united Le Valois to the crown domains. The kings of France from Philippe VI. to Henri III. inclusive are known as the race of Valois. The direct male line ended with Charles VIII.; Louis XII., his successor, belonged to the collateral branch of Valois-Orléans, and the remaining kings, from François I., to that of Valois-Angoulême. (*L'Art de Vérifier les Dates.*)

VALOIS,' HENRY DE, commonly called by his Latinized name, Henricus Valesius, a celebrated French scholar, was born at Paris, on the 10th of September, 1603, and was descended of an antient noble family of Normandy. He was educated at Verdun, in the college of the Jesuits, and afterwards at Paris, in the college of Clermont, where he had the instruction of Petavius and Sirmond, both of whom entertained a high opinion of his talents. In 1622 he went to Bourges to study jurisprudence, and after the completion of his studies he practised for several years as a lawyer, but more to please his father than from his own inclination, for the study of the antient authors was his favourite pursuit. At last however he gave up his professional occupations altogether, and devoted himself entirely to literature. He worked very hard and without any intermission, except on a Saturday afternoon, which he used to evote to his friends. His excessive study cost him his ght eye, and the left was so much weakened that he ould not continue his studies without a reader. But his ther was too economical to allow his son any sum of money r this purpose, and De Valois would have had a miserable cistence, had not a friend, M. de Mesmes, given him a andsome pension. De Valois enjoyed this until the death his father in 1650, which placed him in independent cirumstances. The reputation which he had acquired by this me as a scholar and a critic induced the French clergy apply to him for a new edition of the Greek writers on clesiastical history. De Valois, who had before been quested to lend his assistance in this undertaking, had fused to do so; but now, when the whole was left to him, readily undertook the task. By way of encouragement received from the clergy an annual pension, which was terwards considerably increased by the liberality of Carinal Mazarin. In 1660, while De Valois was still engaged pon this great undertaking, he was honoured with the tle of historiographer to the king. Two years after this e became completely blind. Until the year 1664 he had evoted himself to literature, but now he surprised his iends by marrying a handsome young woman, who bore im seven children. He died on the 7th of May, 1676, ter having suffered very much during the last few years om the infirmities of old age.

Henry de Valois was one of the last of that race of great holars who adorned France during the fifteenth, sixteenth, d seventeenth centuries. He possessed very extensive arning and great critical sagacity, but he knew his owers, he was vain and proud, and resented any neglect the respect which he thought due to him. His ill temer increased as he advanced in years. His works are still ery useful. The following list contains the most importt among them:—1, 'Excerpta Polybii, Diodori, Nicolai amasceni, Dionysii Halicarnassensis, Appiani Alexndrini, Dionis et Joannis Antiocheni, ex Collectaneis Conantini, Augusti Porphyrogenitae, nunc primum Graece dita, Latine versa, cum Notis,' Paris, 1634, 4to. These re the so-called 'Excerpta de Virtutibus et Vitiis,' or Excerpta Peiresciana,' after M. Peiresc, to whom the IS. of the 'Excerpta' belonged, and to whom De Valois ledicated his edition. 2, An edition of Ammianus Marellinus, with critical and explanatory notes, Paris, 1636, to. A second edition, with additional notes by H. de alois, Lindebrog, and the editor, was published by drien de Valois, the brother of Henry, Paris, 1681, fol.; d a third, containing the notes of the Valesii and Linderog, with some of his own, by J. Gronovius, Leyden, 693. 3, A series of the Greek Ecclesiastical Historians, 3 vols. fol., with notes and Latin translations. They ppeared in the following order:—Eusebius (Paris, 1659), ocrates and Sozomen (Paris, 1668), Theodoretus, Evagrius, nd Philostorgius (Paris, 1673). This edition of the cclesiastical historians was afterwards reprinted at Amerdam, 1699, and at Cambridge, in 1720. 4, After his eath there appeared his 'Notae et Animadversiones in larpocrationem et P. J. Maussaci Notas,' edited by J. ronovius. They are reprinted in Blancard's edition of larpocration, Leyden, 1683, 4to.

The Life of H. de Valois was written by his brother drien. It is printed in Bates's 'Vitae Selectorum aliquot irorum,' and some additions to it were afterwards pubshed by P. Burmann, in 1739.

VALOIS, ADRIEN DE, commonly called Adrianus alesius, a younger brother of Henry de Valois, was born t Paris on the 14th of January, 1607. He received the ame education as his brother, but he devoted himself rincipally to the study of poetry, oratory, and history. listory, and more especially the history of his own couny, engaged his attention for many years, and in 1646 he ublished the first volume of his great historical work of rance, under the title 'Gesta Francorum, seu de Rebus rancicis.' The whole work consists of 3 vols. fol., and the st two appeared in 1658. This extensive and very learned ork comprises the history of France only during the hort period from A.D. 254 to 752. It raised his reputation o much, that in 1660 he received the title of historiograher to the king, with a pension of 1200 livres. The minister Colbert wished him to continue the work, but De Valois leclared that he could not, the difficulties being insurnountable. In 1675 he published a very useful work on he state of antient Gaul, entitled 'Notitia Galliarum Ordine Alphabetico digesta,' in fol. His edition of Ammianus Marcellinus and his 'Life of Henry de Valois' are noticed in Valois, Henry de. His other works are now of little importance, and a list of them is found in the works cited below. He died at Paris, on the 2nd of July, 1692. A collection of some minor works of A. de Valois was afterwards published by his son, under the name of 'Valesiana.'

(Perrault, *Les Hommes Illustres qui ont paru en France*; Niceron, *Mémoires des Hommes Illustres*, vol. iii.; Chaufepié, *Nouveau Dictionnaire Historique*.)

VALPARAISO, the principal port of Chile, is situated in 71° 45′ W. long. and 33° 2′ S. lat. It is 55 miles south of Santiago, and 225 north of Concepcion. The town has been nearly rebuilt since the great earthquake in 1822. It consists of 'a long narrow street, built, like Hastings, under the cliff, and it follows the sinuosities of the shore close to the seaside.' (Hon. P. C. Scarlett's *South America*.) The houses have all stories above the ground floor, and they are not flat-roofed. Painted piazzas are substituted for balconies almost at every house, and their different colours give the town a gay appearance. The new custom-house and several of the new churches and other public buildings are handsome edifices. The exchange was built at the expense of the foreign merchants, and is provided by them with fire-engines for the service of the town. The Protestants have a cemetery, and a place of worship, where the service of the church of England is performed. Trade is in the hands of the English, Americans, and French, and a handsome suburb on the heights above Valparaiso is almost exclusively inhabited by them. In 1817, the population of Valparaiso was 17,000; in 1823 it was estimated at 14,000; and in 1834 it was 25,000, according to a census, besides foreigners, whose number in 1841 was between 2000 and 3000. Valparaiso has become a port of great importance since the independence of Chile. In 1809 only nine vessels entered the harbour in twelve months, while in 1836 the number averaged 40 per month. The total number in 1834 was 450, and, excluding 41 ships of war, the burthen of the remainder was 77,700 tons. There are extensive bonding-warehouses, in which goods are deposited to the amount of many million dollars annually. Besides the ships engaged in the import and export trade of Chile, Valparaiso is a most convenient port for vessels from the eastern coast of Asia, the islands of the Pacific, the western coast of North America, and they may be provisioned without even coming to anchor. The roadstead is good in a southerly and easterly wind, but is exposed to the northward. Mr. Sutcliffe, the author of 'Sixteen Years in Chile,' who was harbour-master in 1836, says that in summer there is danger of ships being blown out to sea, unless they anchor near the beach.

VALSA'LVA, ANTO'NIO MARI'A, was born of a noble family at Imola, in 1666. After a preliminary education by private tutors, he was sent to the University of Bologna, where he studied medicine, and especially anatomy, under Malpighi, Salani, and others. He received his doctor's degree in 1687, and was even at that time distinguished for his industry and learning. After this, he devoted himself with extraordinary zeal to the study of both normal and morbid anatomy; dissecting night and day, preparing the dissected parts, and performing experiments; and all this, although he was of a weakly constitution, and was much occupied in private practice. He was equally excellent in surgery and medicine. In the former he is celebrated for having first in Bologna discarded the cautery and adopted the ligature of the arteries in amputations; for having materially improved the whole practice of aural surgery; and for his inventions and improvements of many surgical instruments. He also described the true nature of the steatomatous tumours formed by diseased hair-follicles, the morbid anatomy of apparent glaucoma from amber-cataract, and the constancy of the seat of cataract in the lens or its capsule. In medical practice, applying his unusually great knowledge of morbid anatomy, he was particularly celebrated for accuracy of diagnosis, and for his skill in treating those who suffered under diseases reputed incurable. To these he gave indeed his chief attention; striving to discern what these diseases are in their early stages, when, if ever, some remedy might be used. Among the most remarkable results which he thus attained was that mode of treating aneurisms which is still commonly called Valsalva's method, and which consists in reducing the force of the patient's circulation to the lowest degree compatible with life, by repeated bleeding, absolute rest, and starvation; a method which, often as it has failed, is the only one which offers any prospect of success in aneurism of the aorta. It was he also who first pointed out the dependence of hemiplegia upon effusion in the opposite side of the brain. In normal anatomy he rendered great service by his accurate description of the muscles and other parts of the ear before scarcely known; and by his account of the muscles of the pharynx and soft palate, and of the sinuses of the aorta. Among his errors must be mentioned his notion that the attachment of the muscles of the eye around the optic nerve forms a ring capable of compressing and moderating the action of that nerve, and his account of a duct which he supposed to pass from the renal capsule to the ovary or testis.

In 1697 Valsalva was made professor of anatomy in the University of Bologna, and in 1705 surgeon to the Hospital of Incurables. He was three times president of the Bologna Institute; he was elected a Fellow of the Royal Society of London, and received honours of various kinds from the states and from the learned societies of Italy. He died at Bologna in 1723, leaving to its public institutions a large philosophical and medical library, and the museums of anatomy and surgical instruments, which he had formed. His statue was placed in the hall of the Institute by order of the senate, and his great pupil, Morgagni, wrote his life.

Valsalva's published works are few and small, though full of value. They are, 1, 'De Aure humana Tractatus,' Bologna, 1704. 4to., which was several times afterwards published at Utrecht and other places, and reprinted in Morgagni's 'Epistolæ;' 2, 'Dissertationes Tres Anatomicæ Posthumæ,' Venice, 1740. 4to., read at the Bologna Institute in 1715-16-19, and edited by Morgagni. There is also a letter by Valsalva in Larber's edition of Palfyn's 'Surgical Anatomy.'

(Morgagni, *Life*, prefixed to his edition of Valsalva's works.)

VALTELLI'NA, a longitudinal valley on the Italian side of the Rhætian Alps, drained in its whole length by the river Adda. The Adda rises at the foot of the Stilfser Joch, over which the new road made by the Austrian government leads from the Tyrol into Lombardy, crosses the district of Bormio, or Worms, which lies east of Valtellina, and then entering Valtellina at the defile of La Serra, flows in a general direction from north-east to south-west until it enters the lake of Como at the western extremity of the valley. Valtellina Proper is about 45 miles in length, but if we include Bormio, which is a continuation of the same valley, the whole length is 55 miles. It is bounded on the north by the Swiss canton of the Grisons, the main ridge of the Rhætian Alps dividing the valley of the Adda from that of the Inn or Engadin; on the north-east by the Tyrol, from which it is separated by the lofty group of the Ortler and the Stilfser Joch; on the south by the Lombard provinces of Brescia and Como; and on the west by the upper part of the lake of Como and by the district of Chiavenna, with which it is politically united. Chiavenna consists mainly of the valley of the Liro, a stream which rises at the foot of Mount Splugen, and flowing from north to south, joins the Maira, which comes from the Grisons country. A few miles lower the united stream enters the Laghetto, or upper lake of Como. From the Splugen to the lake is a distance of about 20 miles. The three districts of Valtellina, Bormio, and Chiavenna have been for ages united under the same administration; first under the government of the Grisons, and since the beginning of the present century under the government of Lombardy. For this reason they are often included in historical notices under the general name of Valtellina. They now constitute a province of the Lombardo-Venetian kingdom under the crown of Austria, by the name of 'Delegazione di Sondrio.' Valtellina Proper is the largest and finest part of the whole: it has a genial climate and a fertile soil. The heat is very great in summer. All the fruit-trees of Italy thrive there. It produces abundance of wine, Indian corn, millet, and wheat. It has excellent pastures and meadow-land, and its cheese rivals the best made in Lombardy. The slopes of the lower hills along the northern side of the valley are covered with vines planted in terraces. The level land along the banks of the Adda is not more than a mile and a half in breadth, the mountains rising gradually on both sides and forming numerous transverse valleys between their offsets. Some of the valleys of the northern chain however belong to the canton of the Grisons, which stretches in several places over the Italian slope of the Alps. Such are the Val Poschiavo, south of the Bernina range, whose boundaries extend to within a mile or two of Tirano on the banks of the Adda, and the Val Bregaglia through which flows the Maira to within two or three miles of Chiavenna. The southern ridge, which separates the Valtellina from the province of Brescia, is a lower offset of the Rhætian Alps, which detaches itself from the group of the Ortler, and runs in a south-west direction towards the lake of Como. Its principal summit is Monte Legnone about 8000 feet above the sea. The district of Bormio being more elevated than Valtellina, is colder and less fertile. [BORMIO.] The northern part of the district of Chiavenna is likewise an alpine country, but there is a fine plain between the town of Chiavenna and the lake of Como, which is as productive as any part of North Italy.

The population of Valtellina Proper is about 70,000; but the whole province, including Chiavenna and Bormio, reckons above 85,000 inhabitants. The spoken language is an Italian or Lombard dialect. The province is divided into seven districts, namely: Sondrio, which contains [illegible] communes; Ponte, 10 communes; Tirano, 17 communes; Morbegno, 19 communes; Traona, 12 communes; Bormio, 9 communes; Chiavenna, 18 communes. The principal towns are—1, Sondrio, the head town of the whole province, situated in a fine and fertile territory on the right bank of the Adda, and near the confluence of the torrent Mallero, which rises in the glaciers of Mount dell' Oro in the Bernina range. The cathedral or collegiate church is a handsome structure, and is adorned with paintings by Pietro Legario, a native of the place. Sondrio has a gymnasium, a college for boarders, a court of justice, a theatre, an hospital, and about 4000 inhabitants. 2, Morbegno, a well-built little town on the left bank of the Adda and at the foot of Mount Legnone, over which there is a pass leading into the Val Brembana, in the province of Brescia. In the church of the Dominicans of Morbegno is a good fresco painting by Gaudenzio Ferrari. 3, Ponte, a pretty village a few miles east of Sondrio, out of the high road, and at the foot of the mountains, is the birthplace of the astronomer Piazzi. In the parish church is a very fine painting of the Virgin by Luini. 4, Tirano, a large village on the Adda, is exposed to the inundations of that impetuous river, which has repeatedly threatened it with destruction. Near Tirano is a handsome church cased with white marble and dedicated to the Virgin. An important fair is held here twice a year. 5, Chiavenna, or Clavenna, a pretty town on the river Maira at the branching off of the two roads that lead from Italy into the Grisons, one by Mount Splugen and the other by the Septimer and the Maloya, has several churches, a town-house, once the residence of the Grisons baillis, or governors, a castle, an hospital, several manufactories of silk and of paper, a manufactory of cloth made of amianthus, and another of kitchen utensils made of 'pietra ollaria,' a kind of soft stone found at Prosto, in the neighbourhood, and which are exported in considerable quantities to Italy. A short distance east of Chiavenna, near the borders of the Grisons, is the site of Plürs, a town which was destroyed in 1618 by the fall of a mountain. (Leresche, *Dictionnaire Géographique de la Suisse*; Mercey, *Le Tyrol et le Nord d'Italie.*)

Chiavenna, Bormio, and the Valtellina Proper were in the middle ages dependencies of the duchy of Milan: they were conquered by the Grisons in 1512, in the war against the French, who had occupied Lombardy, and were constituted by them as subject bailiwicks. The Reformed religion gradually spread from the Grisons into the Valtellina, and clergymen and churches of the new communion were established, although the majority of the people remained attached to the Roman Catholic church. The Spanish viceroys of Milan were anxious, both on political and religious grounds, to recover for the duchy of Milan the possession of this fine valley, which could afford the only communication between the Spanish possessions in Italy and the dominions of the house of Austria. The court of France, on the contrary, was opposed to such an approach between the two branches of the house of Austria.

Two political parties existed among the Grisons: one, headed by the powerful house of Salis, was partial to French poliics; whilst the other, headed by the family of Planta, was nclined towards Spain. Each party accused the other of reasonable practices: the minds of the people were inlamed, and at last the French or Salis party contrived to have their rivals outlawed by a strafgericht, or summary court appointed by the people. Among those who were arrested was Rusca, the Roman Catholic archpriest of Sondrio, who died in prison in consequence of the torture o which he was subjected. The Plantas and many of their friends took refuge in the Tyrol, from whence they corresponded with the disaffected Roman Catholics of Valellina, who wished to get rid both of the Protestant clergy and of their Grisons rulers. They were encouraged by the Spanish governor of Milan, who supplied them with arms, and by the court of Rome, who blessed their exertions. Robustelli, a man of noble family of Valtellina, and a relation of the Plantas, and an emigrant like them, put himself at the head of a number of adventurers and desperate men from various parts of Italy. In the night of the 19th of July, 1620, he entered Tirano with his band; the bells rang an alarm, the mass of the people joined the invaders, and the massacre of the Protestants began. All those who belonged to the Reformed religion, whether natives of the Grisons country or of the Valtellina, were put to death with circumstances of great atrocity: neither old men, women, nor children were spared, and their bodies were thrown into the Adda. From Tirano the murderous band spread downwards to Teglio, Sondrio, and the other towns and villages of the valley of the Adda. At Sondrio 140 persons were killed, and about 70 more contrived to escape o the mountains. Several Roman Catholics were killed also, because they showed compassion towards their Proestant countrymen. Paola Baretta, a Venetian lady of a patrician family, who had emigrated on account of religion, was seized and sent to Milan, where she was put to death by the Inquisition. At Morbegno the Roman Catholic population, before the arrival of Robustelli, escorted the Protestant clergyman and his flock in safety into the country of Chiavenna, where the governor, Sprecher de Bernegk, had time to take measures of defence, and thus that district was spared. At Bormio the Protestants had time to save themselves. In all about 600 persons were killed, and others were lost and died of want in the wilderness of the Alps. The Valtellina massacre has been compared to that of St. Barthelémy. Robustelli assumed the title of captain-general of Valtellina. The Grisons marched a force to reconquer the country, but they were repulsed by veteran Spanish troops sent from Milan; and at the same time a large body of Austrians invaded the Engadin, accompanied by the emigrant Plantas. And now began the war in the Grisons country, in which France took the part of the latter against Spain and Austria, and which lasted till 1626, when the treaty of Moncon, between France and Spain, settled for a time the affairs both of the Grisons and of the Valtellina. The Austrians evacuated the Grisons country, and the Spaniards the Valtellina. The latter country was to acknowledge again the Grisons as their rulers, retaining however the power of appointing their own magistrates and the exercise of the Roman Catholic religion exclusively. A body of Papal troops took temporary occupation of the forts of the Valtellina. A few years after, the war having broken out again between France and the house of Austria, a French corps, commanded by the duke of Rohan, joined to a body of Grisons militia, occupied the Valtellina. But the French had to give law to both parties, and the Grisons at last turned against their allies and drove them away. In 1639 a treaty was concluded between Spain and the Grisons, by which the Valtellina was guaranteed its municipal and religious liberties under the sovereignty of the Grisons. In 1641 Austria also joined the treaty. After this nothing particular occurred in the Valtellina until 1796, when General Bonaparte having invaded Lombardy, the people of Valtellina asked their Grisons rulers to be placed on a footing of equality with them by forming a fourth league or state of their Confederation. This demand being refused, some of the malcontents applied to Bonaparte, who, without any other formalities, declared the Valtellina to be annexed to the Cisalpine republic. The Grisons having resented this treatment, the property, public and private, which they held in the Valtellina was confiscated by the Cisalpine Directory, and all the subsequent claims of the Grisons during Bonaparte's government were neglected. In 1814 the Valtellina passed under the dominion of Austria, together with the rest of Lombardy. The Austrian government after some negotiations recognised the claims of the Grisons citizens who had been robbed of their property by the Cisalpine republic, and in 1833 granted them or their heirs an indemnity of 2,109,694 francs.

The history of Valtellina, and especially of the war of religion of 1620-39, has been written by several authors: the best accounts are by Lavizzari, *Memorie Istoriche della Valtellina*; Quadrio, *Osservazioni Storico critiche intorno alla Rezia*; Cantù, *Storia di Como*; and Vulliemin, *Histoire de la Confédération Suisse dans le 16e et 17e Siècles*, being the continuation of Müller's *History of Switzerland*, and a very good work, in 3 vols. 8vo., Paris and Geneva, 1841.

VALUE signifies, in political economy, the quantity of labour, or of the product of labour, which will exchange for a given quantity of labour or of some other product thereof. It is necessary in the outset to distinguish utility from value, or, as Adam Smith expresses the distinction, '*value in use*' from '*value in exchange*.' The utility of an article causes it to be an object of demand; and without some real or imaginary utility an article will not have value; or, in other words, no one will give other articles in exchange for it: but utility alone does not constitute value, except when there is a limited and exclusive possession, which enables one man to refuse to others the enjoyment of any natural product without the payment of an equivalent or price. It is the labour of man alone which in ordinary circumstances creates value. What all may enjoy alike without labour may indeed be most useful and necessary, but cannot be an object of exchange, and therefore is destitute of value. 'The real price of every thing,' says Adam Smith, 'what everything really costs to the man who wants to acquire it, is the toil and trouble of acquiring it. What everything is really worth to the man who has acquired it, and who wants to dispose of it or exchange it for something else, is the toil and trouble which it can save to himself, and which it can impose upon other people.' Hence the labour of man becomes the real measure of the exchangeable value of all commodities.

To illustrate the distinctive character of utility, and the effects of labour and of exclusive possession respectively upon value, suppose a party of settlers to occupy a tract of land, and to divide it amongst them in equal portions by lot. Suppose also that each settler has upon his own land timber, lime, and stone. They all need houses, and have the materials to build them with; but the unaided labour of each man is unable to appropriate and apply the materials in the manner he desires. One man calls in the assistance of his neighbour, and by their joint labour a house is built; and this service he repays by helping his neighbour also to build a house. He can only repay him by labour, because the materials, though of the highest utility, are common to both, but need labour to make them available. It is clear that the timber, the lime, and the stone are in this case without value, and could not be offered by one man in exchange for the labour of another. But suppose it should happen that all the timber, lime, and stone in the whole district should be found in the portion of land allotted to one of the party. Here the materials would not only be objects of utility, but the limited and exclusive possession of them would endow them with value. The fortunate owner of them might say to his neighbours, 'You shall not have any of my materials until you have first built me a house; but when you have each worked for me a day, instead of repaying each of you with a day's labour myself, I will permit you to take the materials for building from my estate.' Here the power of withholding the products of nature from others is productive of value, being equivalent to a certain quantity of labour. But even in this case it is labour which creates the value, and is the measure of exchange between the parties.

The great mass of commodities which are made the subject of exchange amongst men are produced by labour only, and are not affected by any exclusive possession whatever. With these therefore the quantity of labour used in their production is the measure of their real value. They will ordinarily exchange for other commodities upon which an equal quantity of labour has been expended; but there are circumstances which may affect their exchangeable value, while their real value or cost of production may remain the same. If a larger quantity of any article has been produced than there is an effective demand for, its exchangeable value is reduced; if, on the contrary, its supply is unequal to the demand, its value is raised. But these variations cannot be of long duration. Articles which do not repay the cost of production will soon cease to be produced, until the diminished supply has again raised their value; and when articles bear a market value much higher than their cost, production will be encouraged until the supply is not very wide of the demand. Any permanent alteration, therefore, in the exchangeable value of one commodity as compared with another, cannot be referred to these fluctuating and accidental causes, but must be the result of a change in the real value of one or the other, that is to say, in the quantity of labour required to produce it. The value of labour is always the same, but the value of the products of labour changes with circumstances.

The real value of a commodity having been shown to be dependent solely upon the quantity of labour necessary for its production, and the exchangeable value, for the causes stated, never varying materially either above or below the real value, it follows that the price paid for labour does not affect the exchangeable value of articles produced under similar circumstances. If the labourer gains a larger share, the profits of his employer are proportionately diminished; and if his share is less, then profits are increased: while both are generally preserved by competition from any great disproportion.

Equal quantities of labour however are not always equivalent; the skill of one labourer, or the severity of his employment, may render the time for which he is engaged more than equivalent to the same time occupied in labour by another. But this circumstance, though it originally affects the comparative value of commodities produced by different descriptions of labour, is no cause of subsequent variation in their relative value. The relations of different qualities of labour are soon practically adjusted, and are not afterwards liable to much variation.

Every reduction in the quantity of labour required to produce a commodity diminishes its real value, and therefore, for the causes already explained, its value in exchange. Improvements in tools and machinery, by saving the labour of man, reduce the value of commodities; but in estimating their influence, we must not omit to calculate the quantity of labour bestowed upon the article, directly and indirectly—from the growth of the raw material to its finished state—throughout the whole process of manufacture—upon the tools, machinery, buildings, and other appliances by which labour is assisted. Upon the same principles every increase in the quantity of labour directly or indirectly applied adds to the value of a commodity.

The effects of labour upon price become further complicated by the durability of the machinery employed to assist it. If two commodities are produced by machinery at an equal cost of labour, and if the same quantity of labour has also been bestowed, in each case, upon the machinery—the value of such commodities would appear to be the same; but if one machine wears out in two years or needs much labour to keep it in repair, while the other lasts for ten years requiring but little repair—the relative quantities of labour expended indirectly upon the two commodities become so unequal, that a considerable disproportion must be found in their respective degrees of value.

Disturbances of the relative value of different commodities apparently produced by the same amount of labour, are also caused by the comparative quantities of fixed and circulating capital employed, and by the length of time over which the labour is spread, and before the products are brought to market. Under these varying circumstances in the production of articles, the price of labour becomes an element in their relative value, which is not the case when commodities are produced under precisely similar circumstances. If all commodities were produced by an equal proportion of fixed and circulating capital, any rise or fall of wages would affect them all equally, and would not therefore disturb their relations to each other. If a yard of woollen cloth, for instance, exchanged for a yard of silk, and wages rose, the value of each would rise in an equal proportion, and the articles would continue to exchange for each other as before. But if the cloth were produced almost entirely by machinery and the silk entirely by manual labour, a rise of wages would scarcely affect the former at all, while it would add materially to the cost of producing the latter. They would therefore no longer exchange for each other, or, in other words, their relative value would be altered. The general law of such variations is thus stated by Mr. Ricardo, viz., that in the event of a rise in the price of labour, 'only those commodities would rise which had less fixed capital employed upon them than the medium in which price was estimated, and that all those which had more would positively fall in price when wages rose. On the contrary, if wages fall, those commodities only would fall which had a less proportion of fixed capital employed on them than the medium in which price was estimated; all those which had more would positively rise in price.'

With all these causes of disturbance in the relations which the different products of labour bear to each other, it is obvious that no commodity can be a perfect standard by which to compare the variations in the value of other commodities; but as, in an advanced stage of society, labour cannot be the ordinary measure of value, some representative of labour must be selected, by which to carry on the exchanges of trade, and the more nearly it represents the amount of labour expended upon it, and the less that amount varies, the fitter will it be for a common standard of value.

The precious metals, or paper convertible into them, are the standards usually adopted. They are however articles of commerce varying in supply and demand, and in the quantity of labour required, at different times, to produce them. They cannot therefore be invariable standards, but must fluctuate more or less like other commodities. Practically, this variation is not, upon the whole, so great as in the case of other articles, but in the degree in which it prevails it makes gold and silver imperfect standards of value. The circumstances and results of this imperfection and the means of obviating them are amongst the most important speculations of the political economist, but are more fitly treated of in other parts of this work. [BANK; BANKING; CURRENCY; WAGES.]

(Adam Smith's *Wealth of Nations*; Ricardo's *Principles of Political Economy and Taxation*; Mill's *Elements of Political Economy*; MacCulloch's *Principles of Political Economy*; Say, *Richesse des Nations*.)

VALVA'TA, Müller's name for a genus of Gastropods living in fresh waters. [PERISTOMIANS, vol. xvii., p. 454.]

VALVE is the name given to any apparatus by which in an hydraulic or pneumatic machine, the bore of a pipe or any orifice may be alternately covered and uncovered in order in the one case to prevent, and in the other to permit, the passage of the fluid.

The ordinary pump-valve, frequently called a clack, consists of a piece of leather rather greater than the bore or orifice: its form is circular, except that at one part there projects beyond the circumference a portion which is attached to the top of the pipe or to the rim of the orifice. Circular plates of lead or brass are fastened to the upper and lower surfaces of the leather; that which is above being greater, and that which is below being less than the perforation which is to be covered. The valve thus formed is capable, from the flexibility of the leather, of turning, as on a hinge, at the place of its connection with the rim, when, in consequence of the partial rarefaction of the air above, the water from below presses against its inferior surface. After a certain quantity has forced its way through the orifice, the valve, by its weight, falls, and closely covers the latter, so that the water above is in great part prevented from returning. A valve unavoidably creates an impediment to the free ascent of the water; and in order that this impediment may be as small as possible, the valve should be enabled to turn on its joint till it is inclined to the axis of the orifice at an angle of about 60 degrees.

Frequently a narrow bar of metal is made fast across a circular orifice in the direction of a diameter, and two semicircular valves of leather, each of which is covered above and below with a brass plate of the same form, turn upon the sides of the bar as upon hinges; the two portions are turned upwards at the same time by the pressure from below, and they fall back on the orifice when the water has passed through. This is called the double-clack, r the butterfly-valve, and it possesses one advantage over he complete circular valve, in allowing less water to scape into the well or cistern while in the act of closing ver the orifice.

Clack-valves sometimes consist of four sectors of circles, he arcs of which are attached beyond the circumference of the orifice in such a manner, that each sector may turn at the place of junction as on a joint; the four angular points of the sectors, when the valve is closed, meet vertically over the centre of the orifice, and the edges, or radii, rest upon four ribs which are fixed so as to receive them. In this state the sides of the valve are disposed like those of a quadrangular pyramid.

The conical or spindle valve is a metal body in the form of a frustum of a cone, the side of which makes an angle of 45 degrees with a diameter of the base, and its convex surface is ground so as to fit exactly the corresponding side of the orifice. It is usually employed as the safety-valve to the boiler of a steam-engine. The frustum is lifted up vertically by the pressure of the steam, and when the latter has passed, it falls back by its weight: a spring balance is applied to it for the purpose of ascertaining the pressure which is equivalent to the elastic force of the steam. This kind of valve was formerly employed in the pipes connecting the great cylinder of the engine with the boiler and the condenser, but sliding valves are now preferred. [Steam-Engine, pp. 476, 480.] Valves acting in a conical orifice have sometimes the form of a sphere or of a hemisphere, the convex surface of the hemisphere being downwards.

The button-valve is a thin circular plate of metal with a conical side like the former, and its movement is in a vertical direction: in order that this end may be gained, a guide-rod, which is attached at the centre of the plate perpendicularly to its surface, moves freely up and down through a perforation in each of two bars fixed diametrically across, and near the top and bottom of the orifice.

The valve employed for the usual air-pumps consists merely of a slip of thin bladder thoroughly soaked in oil, its breadth being little more than is necessary to cover the orifice, which is a very small perforation in the piston or in the plate under the barrel: the two ends of the slip are tightly bound to the exterior of the perforated plate; and when the pressure of the atmosphere is in part removed from the barrel, some of the air which is in the receiver forces its way, by its elasticity, through the orifice, and escapes at the sides of the valve. The air is prevented from returning merely by the contact of the oiled bladder with the plate at the parts immediately about the orifice.

The valves of machines for condensing air are like those of a rarefying pump, but they are placed in contrary positions: in the latter machines the valves open towards the barrel, and in the former they open towards the receiver in order that the air in the barrel may by pressure be forced into that vessel.

VALVE, in Botany, is a term applied to several parts of plants. Its most common application is to the parts of dehiscent fruits, these parts being in most cases the representative of the carpellary leaf. The term valve has also been applied collectively to the three classes of bracts of which the flower of grasses is composed. It is also applied o the opening in the cells of anthers, which occurs when he pollen is about to be discharged.

VALVULI'NA. [Foraminifera.]

VAMPIRE. According to Dom Calmet's 'Dissertation sur les Vampires,' the vampire is a dead man, who returns n body and soul from the other world, and wanders about he earth, doing every kind of mischief to the living. Generally he sucks the blood of persons asleep, and thus causes their death. Those who are destroyed in this way become vampires. The only manner of getting rid of such unwelcome visitors is, according to the same author, to disinter their bodies, to pierce them with a stake cut from a green tree, to cut off their heads, and to burn their hearts.

The belief that the dead sometimes return to this world, n order to annoy the living, was prevalent among the naions of antiquity. Eastern nations have a similar superstition about malicious ghosts, called 'gouls,' &c. The belief in these apparitions was not destroyed by the introduction of Christianity, but remained, like many other superstitions bequeathed by paganism, in full force during the dark times of the middle ages. The laws of Charlemagne ('Capitularium pro Partibus Saxoniæ') contain certain enactments respecting apparitions called Striga or Masca (this last word signifies a shapeless being). This circumstance proves the generality of this belief during that period.

The advance of civilization in modern times was unable to destroy a superstition founded upon a feeling by which the great mass of mankind is so frequently actuated—fear; and many authors wrote books on the subject. Besides Dom Calmet, whom we have quoted, we may mention —Philip Rerius, an author of the 17th century; Michael Rauft, who published in the last century a treatise 'De Masticatione Mortuorum in Tumulis;' Ferdinand von Scherz. 'In Magia Posthuma,' Olmütz, 1706, &c.

The superstition about the vampires is chiefly prevalent in some parts of Eastern Europe. These apparitions are known in Poland under the name of 'Upior;' in the Ukraine, 'Upeer;' in Russia, 'Googooka;' in Hungary, Servia, Greece, &c., 'Vroucolackas,' 'Vardoulacka,' 'Broncolucka,' &c.

Of all those countries, Hungary and its dependencies may be considered as the principal seat of vampirism, and scarcely a century has elapsed since all Europe was filled with reports about the exploits of vampires in Hungary and Servia. It was during the five years from 1730 to 1735 that vampirism reached its height. It was so general, that Louis XV. of France commissioned his ambassador at Vienna, the Duc de Richelieu, personally to ascertain, in Hungary and other Austrian dominions, the reality of vampirism. The French diplomatist denied in his report to the king the existence of the vampires, and he informed him at the same time that the anecdotes about them were inserted in the contemporary records of the Austrian tribunals. This superstition gained ground so much that the chief periodicals of that time contain accounts of cases of vampirism in Hungary; such as, for instance, the 'Mercure Historique et Politique,' for October, 1736, pp. 403, 411; and the Dutch paper, 'Le Glaneur,' No. ix., for 1733.

We here insert one of them as giving an idea of those reports:—

The Hayduck* Arnold Paul, a native of Madreiga on the frontiers of Servia, was crushed to death by a waggon. Thirty days after his death a report was spread that he was wandering about the world and frightening people. Immediately afterwards four of his acquaintances died suddenly: this brought into the recollection of many that they had heard from Arnold himself that he was bitten by a vampire, and the Haydacks believe that a man who has been bitten or sucked to death by a vampire becomes a vampire himself; consequently it was decided by the whole village of the Hayducks that the deceased Arnold Paul was a regular vampire. Forty days after his death, he was solemnly disinterred, and all the signs of vampirism were found on his body by the general consent of all the villagers: his body was as fresh as that of a living man; the nails, which had been pared, and the beard, which had been shorn, before the burial, had grown again; the veins were swollen and full of blood, with which himself and the winding sheet were covered. The elders of the village immediately ordered the body to be pierced straight through the heart, with a stake cut from a green tree; this made him, according to the relation of eye-witnesses, utter a cry; his head was cut off, and his body, as well as the bodies of those who were supposed to have died from his bite, were burnt.

The protocol of all this event was inserted in the records of a public office. A great number of similar anecdotes which had also been officially registered, are related by contemporary writers; some of them even described the manners and customs of those vampires; as for instance, that lying in their graves they suck and chew their winding-sheets, and that it was therefore necessary to place under their chins a piece of green turf in order that they might not be able to reach the sheets with their teeth, and to bind their hands, that they might not turn about in their coffins. Many believe that the vampires, notwithstanding all the means used to destroy their bodies, will resume their shape, and recommence their mischievous wanderings, as soon as the rays of moonlight fall on their graves. This superstition is chiefly prevalent in Greece, and the tale of 'The Vampire,' ascribed to Lord Byron, was founded upon it.

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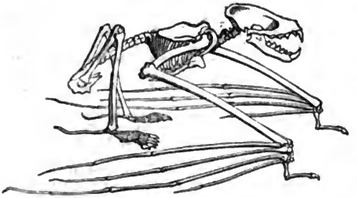
* The Hayducks were originally a kind of light infantry, instituted by Matthias Corvinus, king of Hungary, for the defence of the frontiers. They were afterwards settled as a military colony on the banks of the river Theiss, in a district still called the territory of the Hayducks.

It may be supposed that the superstition about the vampire has derived considerable strength from cases where men, supposed to be dead, have been buried alive. Such cases have happened in many countries, as has been shown by the altered position of the body in the coffin, spots of blood on the torn winding-sheets, bites on the hands, and other marks of the struggle and despair before life became extinct. It is probable that such signs have been sometimes interpreted as the marks of vampirism.

(Dom Calmet's *Dissertation sur les Apparitions des Anges, des Demons, et des Esprits et sur les Vampires d'Hongrie*, Paris 1746, 2 vols. 12mo.; translated into English and published 1759.)

VAMPIRE (Zoology). In the article CHEIROPTERA will be found some account of the authorities relative to the blood-sucking acts of the vampire-bat. [Vol. vii., p. 23.] Since that article was written, Mr. Darwin's *Journal* has been published, and we there find a record of the blood-sucker being caught in the fact.

'The Vampire-bat,' says Mr. Darwin, in that part of his highly interesting book which relates his adventures when travelling on horseback in the neighbourhood of Rio Janeiro, 'is often the cause of much trouble by biting the horses on their withers. The injury is generally not so much owing to the loss of blood as to the inflammation which the pressure of the saddle afterwards produces. The whole circumstance has lately been doubted in England: I was therefore fortunate in being present when one* was actually caught on a horse's back. We were bivouacking late one evening, near Coquimbo, in Chile, when my servant, noticing that one of the horses was very restive, went to see what was the matter, and fancying he could distinguish something, suddenly put his hand on the beast's withers, and secured the vampire. In the morning the spot where the bite had been inflicted was easily distinguished, from being slightly swollen and bloody. The third day afterwards, we rode the horse without any ill effects.'



Skeleton of Vampire. (De Blainville.)

VAN. [ARMENIA, p. 360.]

VAN ACHEN, HANS, or JOHN, one of the most distinguished German painters of the sixteenth century, was born at Cologne in 1552. His name is written in various ways, as Ab Ach, Dach, Dac, Van Aken, and otherwise; but Van Achen is the correct form: a picture in the gallery of Schleissheim, near Munich, is marked HANS V. ACH. FE. 1598. His family name is not known; he was called Achen, after the town of Achen or Aachen (Aix-la-Chapelle), the birthplace of his father. Van Achen was first instructed by a painter called Jerrigh by Van Mander, with whom he remained about six years. He studied also the works of Spranger, whose style of design he imitated, and although not so mannered as that master, he never forsook his style of design in after-life. Shortly after he left his first master he went to Venice to acquire the Venetian style of colouring, which he learnt of Gaspard Rems, a Fleming, who at that period was one of the most distinguished colourists at Venice. From Venice he went to Florence and Rome. In Rome he acquired a great reputation by several pictures which he painted there, some of which were engraved by Raphael Sadeler, who was at Rome at the same time. A Nativity of Christ, painted for the church of the Jesuits at Rome, extended Van Achen's reputation to Germany. He visited Venice a second time, and whilst there received an invitation from Duke William of Bavaria to go to Munich, whither he repaired; and he received constant employment there for some years, and was paid very highly for his works. During his stay at Munich he was repeatedly invited by the emperor Rudolph II. to go to Prague; he however allowed four years to elapse before he complied with the emperor's request. At Prague he painted many pictures for the emperors Rudolph and Matthias, and, excepting a short time spent at Munich and Augsburg, he passed the remainder of his life there. Whilst at Augsburg he gained the affections of the daughter of the celebrated musician Orlando di Lasso, and was married to her. He died at Prague in 1615, aged sixty-three.

Van Achen had the reputation of being the richest painter of his time. He was a bold and a rapid painter, but was a great mannerist: he neglected both the study of nature and of the antique, and was one of the leading propagators of that gross and heavy style which prevailed in Germany at the beginning of the seventeenth century. It consisted of an attempted union of the Florentine and the Venetian styles, and combined a florid colouring with exaggerated and mannered forms. This style prevailed generally in Germany, until Rubens and Rembrandt and their imitators spread a very different taste. Achen's principal works are at Munich: the best are—the Calling of St. Peter, for St. Michael's Church; a St. Sebastian, for the Stanislaus Chapel, engraved by J. Müller; Christ upon the Cross, with John and Mary, for the Chapel of the Cross, engraved by E. Sadeler; and the Discovery of the Cross by St. Helena, for the chapel of the elector. There are several of his works also in the Gallery of Vienna, among them, portraits of Rudolph II. and his brother Ernest when young, both in armour. He painted many portraits: two of his best are considered, the portrait of Rudolph II., engraved by R. Sadeler; and that of Spranger the painter, engraved by J. Müller. Other celebrated works by Achen are—an 'Ecce Homo,' engraved by G. André; Mary Magdalen in the Wilderness, by L. Kilian; and Justice and Truth, by G. A. Wolfgang the elder. Many other eminent engravers have executed plates after this master.

(Van Mander; Sandrart; Fiorillo; Nagler.)

VANA'DIUM, a metal discovered in 1830 by Sefström, and named from *Vanadis*, a Scandinavian divinity; it has been since found by Professor Johnston: the former obtained it from the iron of Taberg in Sweden, and from the slag of the ore, and the latter from a new mineral occurring at Wanlock Head, which he found to be vanadiate of lead. The metal may be obtained from the native vanadiate of lead: its properties are, that it has somewhat of a silvery lustre, is extremely brittle, is a conductor of electricity, and at common temperatures is not acted upon by air or water; when heated to low redness in the air, it burns and is converted into black oxide; neither sulphuric, hydrochloric, nor hydrofluoric acid acts upon it, but nitric acid and aqua regia dissolve it, and blue solutions are obtained.

Oxygen and Vanadium combine to form two oxides and an acid; protoxide of vanadium is produced by the action of hydrogen or charcoal on vanadic acid; it is a black powder, has a semi-metallic lustre, and when made coherent by pressure conducts electricity like a metal; when heated in the air it combines slowly with oxygen, and becomes the peroxide. It does not form saline compounds with acids, and it is composed of—

One equivalent of oxygen	.	8
One equivalent of vanadium	.	68
		—
Equivalent	.	76

Peroxide of Vanadium.—This may be obtained by the partial deoxidizement of vanadic acid by means of hydrosulphuric acid, or by heating, excluded from air, 10 parts of the protoxide with 12 parts of vanadic acid. This is the only salifiable oxide of the metal: its acid solutions when decomposed by carbonate of soda yield a grey-coloured hydrate; when pure and free from water, it is black. The salts of vanadium, like those of iron, are precipitated black y the tincture of galls. Peroxide of vanadium consists f—

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* This bat belongs to the genus *Edostoma* of D'Orbigny, but is a new species. (Darwin.)

Two equivalents of oxygen	.	16
One equivalent of vanadium	.	68
Equivalent	.	84

Vanadic Acid is obtained by heating vanadiate of amonia so as to expel the alkali. The vanadic acid left is rown when in powder and red when fused; it suffers no hange when heated; it is tasteless, nearly insoluble in ater, and quite so in alcohol. It consists of—

Three equivalents of oxygen	.	24
One equivalent of vanadium	.	68
Equivalent	.	92

Chlorine and Vanadium.—When hydrochloric acid is nade to act upon peroxide of vanadium, a brown compound s formed, which appears to be a bichloride of vanadium, omposed of two equivalents of chlorine 72 + 1 equivaent of vanadium 68 = 140; the terchloride, composed of hree equivalents of chlorine 108 + 1 equivalent of vaadium 68 = 176, is formed by passing dry chlorine gas ver a red-hot mixture of protoxide of vanadium and charoal; it is a yellow liquid, which, when acted upon by ater, yields hydrochloric and vanadic acids.

Sulphur and Vanadium.—The bisulphuret is obtained y passing hydrosulphuric acid gas over the peroxide of anadium heated to redness. The tersulphuret is formed y adding hydrochloric acid to a solution of vanadic acid n hydrosulphuret of ammonia.

Salts of Vanadic Acid are generally yellow or orange-oloured, but are sometimes colourless; it forms both eutral and bisalts, those containing the alkalis being oluble, but those resulting from most metallic oxides are paringly soluble or insoluble in water.

VANBRUGH, SIR JOHN, was of foreign lineage, his randfather, a citizen of Ghent, having come over to Engand at the time of Alva's persecution of the Protestants n the Netherlands. He died in 1646, leaving a handsome ortune to his son Giles, who seems to have been at first ngaged in business, but afterwards held the place of omptroller of the treasury chamber. Giles lived till 1715, nd had a family of eight sons by his wife Elizabeth, oungest daughter and coheir of Sir Dudley Carleton, who ied in 1711. John was born in 1666, but beyond that ery little is known with certainty respecting him till he egan to write for the stage. We have no account of his arly studies, and it appears rather doubtful if he was reularly educated to the profession of architecture; cerainly no claim has been put forth in behalf of any one for he honour of having been the instructor of such a pupil. ccording to some anecdotes told of him, he studied arhitecture in France, where, being detected in making rawings of some fortifications, he was imprisoned in the astile. That he was sent by his father to that country at he age of nineteen does not admit of much doubt; yet hether it was for the purpose of completing or comencing his studies in architecture is not very clear. If his was the case, he did not attend to them very diligently, r in the course of his stay there he entered the military rvice, though he did not continue in it very long. It certainly to be regretted that no more satisfactory acount has come down to us, for it would be instructive to arn how an architect of such a peculiar taste formed a yle which may be called his own. Still we think it may traced to French models—to the palaces and châteaux that country, of which lofty pavilions, turrets, and chimeys were characteristic features, and produced that vaety of outline which is considered the great merit of anbrugh's designs. From the same source he seems to ave derived his predilection for arched windows and hozontal rustics, even to the exclusion of variety in that espect. In fact he seems to have had little knowledge f, or else little relish for, the works of the Italian school, nce, with all his love for massiveness and boldness, he ever availed himself of its more ornate and diversified odes of rusticated work. [RUSTICATION.]

Whatever may have been his progress up to that period, e must suppose him to have acquired some reputation r architectural skill previously to 1695, for he was then ppointed one of the commissioners for completing the alace at Greenwich when it was about to be converted nto an hospital. About the same time he began to distinguish himself in his other and widely different career of a dramatic writer; and of his masterly talent for comedy his plays of the 'Provoked Wife,' the 'Relapse,' and the 'Confederacy' (the last founded upon Dancour's 'Bourgeoises à la Mode'), afford sufficient proof, and also of the levity of his disposition, if not of the licentiousness of his morals. Considered merely as literary productions they are entitled to unqualified admiration; yet so libertine are they, not merely in language, but in plot, in sentiment, and in general tendency, that they are calculated to corrupt as well as to please. They are now banished not only from the stage, but almost from the closet; and he who might have been the Molière of our dramatic literature—a standard classic author in it—is now consigned to comparative oblivion. Fortunately he had an opportunity of displaying his other talent, and that upon a large scale. In 1702 he was employed by Charles, the third earl of Carlisle, to erect a mansion for him in Yorkshire, on the site of the ancient castle of Henderskelf; and he produced the palace of Castle Howard, an extensive and noble pile (660 feet in length), though, like all his other works of that class, more satisfactory in its general character than when examined in detail. His patron Carlisle, who was then earl marshal of England, signified his approbation by bestowing on him the honourable and not unprofitable appointment of Clarencieux king-at-arms, in 1703. His work of Castle Howard also recommended him as architect to many noble or wealthy employers, for whom he erected stately mansions in various parts of the kingdom. Among them may be mentioned Eastbury in Dorsetshire, built for Bubb Doddington, but afterwards pulled down by earl Temple (a circumstance not greatly to be regretted, if we may judge of it from the designs in the 'Vitruvius Britannicus'); King's Weston, near Bristol, which is greatly admired for the effect produced by its chimneys; Duncombe Hall, Yorkshire; Grimsthorpe, Yorkshire, considered one of his most important works; Seaton Delaval, Northumberland; and Oulton Hall, Cheshire. He seems to have been employed exclusively on works of this class, country-seats and mansions: for no public buildings are attributed to him except one, which was a speculation of his own, connected with his dramatic pursuits, a theatre in the Haymarket, which afterwards became the original Opera-house, on the site of the present building. In this scheme he was assisted by many persons of quality, and had Congreve for his dramatic coadjutor and Betterton for manager, by whom the house was opened in 1706. This 'confederacy' of comic talent was not however so successful as Vanbrugh's piece of that name, which was first brought out there. Congreve very soon retired from the concern, nor was it long before Vanbrugh himself was glad to get out of his share in it.

It was at this period that the nation voted, as a monument of its gratitude to the first duke of Marlborough, a palace, to be named after the victory at Blenheim. The architect of Castle Howard was appointed as the fittest person for so important an occasion. Yet if the distinction and the reputation since derived to him from the building itself have shed lustre on Vanbrugh's name as an architect, the affair turned out for him a very vexatious and also a losing one. 'The secret history of the building of Blenheim,' in D'Israeli's 'Curiosities of Literature,' shows in what difficulties the architect was involved in consequence of no specific fund or grant for the work having been provided by parliament, and being afterwards refused. The queen furnished the necessary supplies for what was built during her life; but at her death difficulties increased, and on that of the duke, his wife Sarah, 'that wicked woman of Marlborough,' as Vanbrugh calls her, discharged him from his post of architect, and refused to pay what was due to him as salary. The structure was however finally completed according to the original model, and as long as it stands it will be a monument honourable to Vanbrugh. Yet it was a long time before its architectural merits were appreciated. Reynolds was almost the first who ventured to express his approbation of Vanbrugh's style, and to bear his testimony as an artist to the picturesque magnificence of Blenheim. Such authority, and afterwards that of Sir Uvedale Price and others, removed the prejudices that had been excited by former critics, and by the ridicule thrown upon Vanbrugh by Swift and Pope. But, in changing, public opinion ran almost from one extreme into the other: as it had been the fashion to see in Vanbrugh's architecture nothing but heaviness, it now became the fashion to see in it nothing but picturesque effect. His works certainly are heavy; and although solidity and massiveness are far from being faults in architecture, they may be carried too far. Vanbrugh's buildings are to be studied both with diligence as to their merits and with caution as to their defects.

Sir John died at his house at Whitehall (erected by himself), March 26, 1726, leaving a widow, many years younger than himself, but no family, his only son having been killed at the battle of Tournay. Notwithstanding the licentiousness of his pen, his private character appears to have been amiable, and his conduct tolerably correct; and even his enemies Swift and Pope admitted that he was both 'a man of wit and man of honour.'

VAN CEULEN, or KEULEN, LUDOLPH, a Dutch mathematician, who lived in the latter part of the sixteenth and the beginning of the seventeenth century, and whose name indicates that his family came originally from Cologne. He was born at Hildesheim, but neither the year of his birth nor the manner in which he was educated is known; and it can only be surmised that his taste led him early to the study of elementary geometry and algebra. He taught the mathematics at Breda, and subsequently at Amsterdam; but his fame rests chiefly on the effort which he made to express by numbers the ratio which the circumference of a circle bears to its diameter. The determination of this ratio has engaged the attention of mathematicians from the time of Archimedes; and during the sixteenth century, Metius, Vieta, Adrian Romanus, and Van Ceulen laboured, by extending the approximative processes, to reduce the error within narrower limits. The diameter being supposed to be the unit, Romanus obtained an expression for the circumference in numbers consisting of seventeen decimals, and Van Ceulen computed one which differs from the truth only at the thirty-fifth decimal. It may be observed that the approximation has since been carried to a much greater extent by means of the well-known series for the value of a circular arc in terms of its tangent. [QUADRATURE.]

Van Ceulen published at Delft, in 1596, a tract on the circle, in Dutch; and a translation of it, in Latin, was published by Snellius in 1619, under the title 'De Circulo et Adscriptis.' The method pursued in the investigation is described in this work; and though extraordinary labour must have been undergone in the performance of the arithmetical computations, it may be seen that this was not accompanied by any display of genius; since, beginning with the known chord and the sagitta of one-sixth of the circumference, the process consists in computing the lengths of the chords and tangents of the arcs formed by continual bisections. As a monument of patient industry the determination has great merit; and it may be presumed that the computer estimated his labour highly, for, according to Snellius, he requested that the numerical expression of the circumference of a circle might be inscribed on his tomb.

Besides the work which has been mentioned, Van Ceulen published two others, in Dutch, on mathematical subjects, both of which were also translated into Latin by Snellius, and published at Leyden in 1615, under the titles 'Fundamenta Arithmetica et Geometrica,' and 'Zetemata (seu problemata) Geometrica.' From these works it may be seen that the author possessed considerable skill in the management of algebraic quantities.

He died at Leyden in 1610, and was interred in the church of St. Peter in that city.

VANCOUVER, GEORGE, was born, according to the author of his Life in the 'Biographie Universelle,' about 1750, but probably some years later. Vancouver himself states, in the introduction to the narrative of his voyage round the world, that he entered the navy in his thirteenth year; and John Vancouver, who edited the work, states that his brother's first appointment was to the Resolution, by Captain Cook, in 1771.

George Vancouver served as midshipman on Cook's second voyage (1772-1775); and on the third voyage, in which that great navigator lost his life (1776-1780). His name only occurs once in the history of these two voyages: Captain King mentions his having sent Mr. Vancouver to Captain Clerke for instructions the morning after the murder of Captain Cook. When Captain King was promoted from being first lieutenant of the Resolution to be captain of the Discovery, Captain Gore permitted him to take with him 'four midshipmen who had made themselves useful to me in astronomical calculations, and whose assistance was now particularly necessary, as we had no Ephemeris for the present year.' Of this number it is almost certain that Vancouver must have been one, for of the six original midshipmen of the Resolution, the two eldest had by this time been promoted in consequence of the deaths of Captains Cook and Clerke. A better school for a seaman than the two principal voyages of so accurate a navigator and surveyor, so strict a disciplinarian as Cook, can scarcely be imagined. Captain King has born testimony to the merit of the young officers in the expedition of 1776-80: 'The two ships never lost sight of each other for a day together, except twice; which was owing, the first time, to an accident that happened to the Discovery off the coast of Owhyhee; and the second, to the fogs we met at the entrance of Awatska Bay. A stronger proof cannot be given of the skill and vigilance of our subaltern officers, to whom this share of merit almost entirely belongs.'

The Resolution and Discovery reached the Nore on the 4th of October, 1780, and on the 9th of December following Vancouver was created a lieutenant and appointed to the Martin sloop. He continued on board this vessel till he was removed into the Fame, one of Lord Rodney's fleet in the West Indies, where he remained till the middle of the year 1783. In 1784 he was appointed to and sailed in the Europe to Jamaica, and remained on that station till the vessel returned to England, in September, 1789.

When Vancouver arrived in England, he found that a voyage had been planned by the government for exploring the Southern regions. A vessel, named the Discovery, had been purchased for this service, and Captain Henry Roberts, who had served under Cook during his two last voyages, had been named to the command. Commodore (afterwards Admiral) Sir Alan Gardner, under whom Vancouver was then serving, recommended him to the Admiralty, and he was solicited by the board to accompany Captain Roberts. Having been intimate friends while on board Captain Cook's ship, the arrangement was agreeable to both officers. Towards the close of April the Discovery was nearly ready to proceed down the river, when intelligence arrived of depredations committed by the Spaniards on different branches of British commerce on the north-west coast of America. The equipment of the Discovery was suspended, and Vancouver resumed his professional career under his old captain, Sir Alan Gardner.

The high prices obtained by the sailors of the Resolution and Discovery, at Canton, for the ill-selected, half-worn furs which they had brought from the north-west coast of America, had attracted a horde of adventurers to that region. Their inaccurate observations, published by ignorant book and map compilers, had given currency to the most inaccurate and contradictory accounts of the coast. The discoveries of Cook had also stimulated the Spaniards to resume their long-suspended maritime activity. A survey of the north-west coast of America by Spanish officers of marine was commenced in 1775, and prosecuted with intermissions for several years with skill and dexterity. In April, 1789, an attempt was made by some British subjects to establish themselves at Nootka: the attempt gave umbrage to the Spanish officer engaged in the survey; the settlement was forcibly broken up, and some commanders of British merchantmen made prisoners, and their vessels and cargoes seized. The court of Spain yielded to the representations made by the British resident, and at his request a letter addressed to the Spanish commandant at Nootka, instructing him to deliver up possession of the country and buildings to the British officer by whom the letter should be delivered to him, was transmitted to the court of St. James's by Count Florida Blanca. The Discovery was again put in commission; the Chatham, an armed tender, destined to accompany her; and in March, 1791, Vancouver was appointed to command these vessels on an expedition to the north-west coast of America. His instructions were, to receive the surrender of Nootka by the Spaniards; to make an accurate survey of the coast from the 30th degree of N. lat. northwards; and to inquire after any communications by inlets, rivers, or lakes, between the coast and Canada. The summers of 1792-93 were allowed for the execution of the survey; the intervening winter was to be spent in completing the examination of the Sandwich Islands. After e completion of the survey, the vessels were to return to gland by Cape Horn, and, if practicable, to examine the st coast of South America, from the south point of the and of Chiloe, supposed to be about 44° S. lat., in order ascertain which was the most southern Spanish settle- nt, and what harbours there were south of that settle- nt.

The expedition sailed from Falmouth on the 1st of ril, 1791. The close of that year and the beginning of 92 were occupied in an examination of the Sandwich ands. On the 16th of March the vessels sailed for the ast of America, which they struck in 39° 27′ N. lat. ey ran down the coast, examining it minutely, to otka, where the frank and honourable conduct of adra, the Spanish commander, rendered the diplomatic rt of Vancouver's commission easy and agreeable. From otka the expedition returned southward to San Fran- sco de Monterez, examining more in detail the various lets along the coast. When the season during which e operations of the survey could be carried on with fety terminated, Vancouver returned to the Sandwich lands. On the 29th of April he was again off the coast America, near Cape Mendocino. He landed at Rocky int (41° 2′ N. lat.), discovered and taken possession of the Spaniards in 1775. Thence he ran along the shore Nootka, where the coast survey was resumed. Van- uver returned on the approach of winter to Owhyhee, d in 1794 again returned to the American coast, which surveyed as far north as Cook's Inlet. Having con- uded this operation, he, in compliance with his instruc- ns, sailed along the coast of South America, visiting the incipal Spanish settlements, and doubling Cape Horn, ought the Discovery into the Shannon on the 13th of ptember, 1795. During the whole of these operations e most cordial assistance and frank communications re interchanged by Vancouver and the Spanish officers gaged in a simultaneous survey of the coast.

In 1794 Vancouver had without solicitation been pro- oted to the rank of post-captain. He was paid off at the nclusion of his voyage, and from that time till his death, hich took place in May, 1798, he was incessantly busied reparing his journals for publication. Before his death, l the charts were completed, and the narrative printed d corrected as far as the 408th page of the third vo- me. The little that remained to be told was prepared r the press by his brother John. Of all the pupils of ok, George Vancouver approached nearest to his master accuracy and persevering energy. With the exception sixteen months, and the two years during which he was sy preparing his journals for the press, he was en- ged in active service till his death. The greater part of s survey of the north-west coast of America was per- med in boats. The arduous service undermined his nstitution, and on his return to England it was apparent at his death must be a premature one. The same exact forcement of discipline, and the same incessant care of e health and comfort of his crew, which characterized ok, were also found in Vancouver. The narrative of his yage is still the principal authority for the delineations the north-west coast of America: it is also an important rt of the evidence upon which the rival claims of the nited States and Great Britain to what is now called the regon territory must be decided.

(Cook, *Second and Third Voyages*; Vancouver, *Voyage Discovery to the North Pacific Ocean and round the orld*; Humboldt, *Essai Politique sur la Nouvelle pagne; Biographie Universelle.*)

VANCOUVER ISLAND. [NORTH WESTERN TERRI- RY.]

VANDA, a genus of plants, which gives its name to the ibe Vandeæ, of the natural family of Orchidaceæ. The me is that of one of the species (Vanda Roxburghii) in nscrit, and which is commonly applied in Bengal to her species. These are mostly very ornamental, like hers of the Indian epiphytal Orchideæ. From the warm rts of Nepaal and the peninsula of India the species ex- nd into the islands of the Indian Ocean, and even into hina.

VAN DALE, ANTON, a learned Dutchman, was born the 8th of November, 1638. He was the son of a mer- ant, and, in compliance with the wish of his parents, he gaged in mercantile occupations up to the thirtieth year his age. But the desire of knowledge which he had felt ever since his childhood induced him to abandon commerce and devote himself to the study of theology and medicine. After the completion of his studies he took his degree of doctor of medicine; but, besides his medical practice, he officiated for several years as a preacher among the Mennonites, until he was appointed physician to the hospital at Haarlem, where he remained until his death, on the 28th of November, 1708.

Notwithstanding his medical practice, Van Dale never abandoned his theological studies, and he also devoted a great deal of his leisure to the study of Greek and Roman antiquities. His works, which are all of a theological and antiquarian nature, show great learning and critical skill, but they are deficient in method and arrangement. They are all written in Latin, but the language is bad, and his works have ceased to be of much use. The following were at the time regarded as the most important:—1, 'Dissertationes II. de Oraculis,' 1700, 4to.; 2, 'De Origine et Progressu Idololatriae et Superstitionum,' 1696, 4to.; 3, 'Dissertatio super Aristea de Septuaginta Interpretibus,' 1705, 4to. Several other dissertations, as 'Super Sanchuniathone,' and nine 'Dissertationes Antiquitatibus et Marmoribus cum Romanis tum Graecis inservientes,' were published after his death (1712 and 1743, 4to.).

(*Acta Eruditorum*; Niceron, *Mémoires des Hommes Illustres*; Jöcher, *Allgem. Gelehrten-Lexic.*)

VANDALS. [TEUTONIC NATIONS.]

VANDELLI, DOMINIC, an Italian physician, who paid much attention to the study of natural history. His earliest contribution to natural history was a dissertation on some insects and marine zoophytes, accompanied with drawings. This was published at Padua, where he probably graduated, with the title 'Dissertationes de Aponithermis, de nonnullis Insectis terrestribus, et Zoophytis marinis,' 4to., 1758. In 1761 he published an account of some of the Confervæ found in the hot-springs of Padua. He visited South America, and remained in Brazil some time, and on his return was appointed superintendent of the botanic garden at Lisbon. In 1768 he published an account of the dragon-tree, and in 1771 a small work entitled 'Fasciculus Plantarum,' which he dedicated to Sir Joseph Banks. It was accompanied with four engravings of figures of plants. He also wrote against Haller, maintaining, in opposition to that distinguished anatomist, that the tendons and fibrous membranes generally possessed sensibility. This is said to have displeased Haller very much, who speaks of Vandelli's labours very disparagingly. He also wrote some small papers on the actions of medicine and other subjects. He visited England at a very advanced age, in the year 1815. He is since dead. He was a correspondent of Linnæus; and, at the suggestion of Browne, Linnæus named a genus of Scrophulariaceous plants, in honour of him, *Vandellia*. The species of this genus are West Indian plants, and one of them, the *V. pratensis*, is known in Cayenne by the name of Wild Basil, and is esteemed a powerful vulnerary.

(Haller, *Bib. Bot.*, vol. ii.; Bischoff, *Lehrbuch der Botanik*; Sir J. E. Smith.)

VANDE'LLIA, a genus of plants of the natural family of Scrophularineæ, so named from Vandelli. The genus Vandellia is distinguished by having a nearly equal calyx, which is 5-toothed or 5-parted. Corol tubular, with a 5-cleft bilabiate limb. Stamens 4, didynamous, all fertile. Two lower filaments appendiculate, or gibbous at the base. Capsule globose, oblong, or linear; 2-celled; 2-valved; valves entire, membranous. The species are natives of warm parts of the world, such as India, Birma, China, and Brazil, forming smooth or hairy herbs, with tetragonal stems; leaves opposite, usually toothed. Flowers axillary, opposite or in fascicles; the upper ones generally racemose. The only species which has attracted any particular notice is V. diffusa, a native of Brazil, thought to be found also in the peninsula of India. It is the Caaetaica of Pison, and described by Dr. Hancock as emetic, and its decoction as useful in fevers and liver complaints. It was mentioned in the address of the Earl Stanhope, in 1829, to the Medico-Botanical Society, that it might become a useful substitute for some of the purgatives now in use.

VANDER HELST, BARTHOLOMEW, a celebrated Dutch portrait painter, born at Haarlem in 1613, or, according to the 'Museo Fiorentino,' in 1601. He was one of the best portrait painters of his time, and has by some been compared with Vandyck. He excelled equally in the head and figure and in the accessories, which he painted with the fidelity of representation almost peculiar to the painters of his nation: he also coloured richly and drew well. He painted likewise small historical pieces, and had great skill in landscape painting.

In the town-house of Amsterdam there is a large picture by Vander Helst, containing twenty-four full-length portraits of officers of the train-bands of that place, which Sir Joshua Reynolds pronounced the finest picture in the town-house, and the best picture of portraits in the world. He says, 'This is perhaps the first picture of portraits in the world, comprehending more of those qualities which make a perfect portrait than any other I have ever seen: they are correctly drawn, both heads and figures, and well coloured; and have great variety of action, characters, and countenances, and those so lively, and truly expressing what they are about, that the spectator has nothing to wish for.' This picture is dated 1648. Vander Helst was still living in 1668: Pilkington and some others mention 1670 as the date of his death; Houbraken gives no date, and Nagler says the date of his death is unknown. Vander Helst left a son, according to Houbraken, who painted battle-pieces and landscapes, but he was very inferior to his father.

(Houbraken, *Groote Schouburgh der Nederlandsche Konstschilders*, &c.; Nagler, *Neues Allgemeines Künstler Lexicon.*)

VANDER HEYDEN, JAN, a celebrated Dutch architectural painter, born at Gorcum in 1637. He learnt originally of an obscure painter on glass, and commenced early without other instruction to paint pictures of old buildings, churches, palaces, and other architectural views. He is unrivalled for the representation of modern architecture: his pictures are remarkable for their elaborate finish and the beautiful arrangement of their masses of light and shade; and yet, through their admirable perspective and harmony of colouring, they have all the softness and truth of nature, and in this respect are superior to the works of Canaletto.

Sir Joshua Reynolds says that the works of Vander Heyden have 'the effect of nature seen in a camera-obscura.' There are several of his works in this country. In the collection of Sir Robert Peel there is a very small view, on wood, of a street in Cologne, with figures by A. Vandervelde, which was purchased for 415 guineas. There is also in the collection of Lord Ashburnham a small town view, on wood, with twenty figures by A. Vandervelde, which was sold for 600*l*. It was taken by the French, and was placed for some time in the Louvre, but was sent back to Holland at the general restoration of the works of art carried off by the French to their rightful owners. There is likewise in the Bridgewater Gallery an excellent specimen of the works of Vander Heyden. A. Vandervelde painted figures in many of Vander Heyden's pictures, and after that painter's death he was assisted by Lingelbach. One of his best pictures is a view of the town-house of Amsterdam: it is now in the Louvre. He painted also views of the Royal Exchange of London, and of the London Monument.

Vander Heyden was a mechanic as well as a painter, and he is said by some Dutch writers to have been the inventor of fire-engines. This is however not sufficiently attested; yet he is known to have been a great improver of those machines, both in their efficiency and portability. He published, in 1690, a book in folio upon the subject, with illustrations drawn and etched by himself; and he was appointed by the authorities of Amsterdam to the office of director of the fire-engines of that city, with an annual salary. This appointment interfered with Vander Heyden's time for painting: he executed several good pictures after it notwithstanding.

(Houbraken, *Groote Schouburgh*, &c.; Descamps, *La Vie des Peintres Flamands*, &c.; Waagen, *Künstwerke und Künstler in England und Paris.*)

VANDER MEER, JAN. There were apparently three Dutch painters of this name, but the accounts of them do not agree; some writers relate of only two artists what others relate of three.

Jan Vander Meer, the old, was born at Rotterdam in 1627. He painted in various styles, but excelled chiefly, according to D'Argenville, in small landscapes with figures, and in sea-pieces, in which he displayed a perfect knowledge of the construction of ships. This account has however been questioned, for Vander Meer painted historical pieces and portraits, and is said also to have painted some battle-pieces; and it is not probable that the same painter should practise in so many different lines. According to Houbraken, he visited Italy and spent several years in Rome. In 1664 he was dean of the guild of painters in Amsterdam, and was at one time in affluent circumstances: he purchased a picture of De Heem for [illegible] florins, which eventually proved of great service to him.

In 1672, when nearly all his property was either destroyed or stolen by the French at Utrecht, he presented this picture to the Prince of Orange, who gave him a situation under the government, and in 1674 created him a counsellor. The landscapes and other small pieces attributed to this painter are executed in a light and [illegible] manner, but are too blue in the distances. According to Van Eynden and Vander Willigen, in their 'History of National Art,' Vander Meer painted only history and portrait. The date of his death is not known.

Jan Vander Meer, the young, a relation of, and according to some, the son of the preceding, was born in 1656. He was first instructed by the elder Vander Meer, and after his death he became the scholar of N. Berchem, in whose style he executed a few pictures, but he painted chiefly landscapes with sheep and goats. His landscapes are excellent, and in painting sheep, which predominate in his pictures, he has not been equalled by any of his countrymen: he seldom painted horses or cattle. He excelled also in making pen-and-ink drawings, which he shaded very skilfully with Indian-ink. He etched likewise a few plates in a very masterly manner. He died in 1705 in great poverty, brought on by intemperate habits. Some of the pictures attributed to the elder Vander Meer have been most likely painted by the younger.

The supposed third artist of this name is by some writers called John, and by others Jacob, and the misfortune said to have happened to the elder Vander Meer at Utrecht is related of this artist, but the accounts are too discrepant to enable us to say decidedly whether there were three or only two artists of this name.

(Houbraken, *Groote Schouburgh*, &c.; D'Argenville, *Abrégé de la Vie des plus fameux Peintres*, &c.; Nagler, *Neues Allgemeines Künstler Lexicon.*)

VANDERMEULEN, ANTONY FRANCIS, a celebrated Flemish landscape and battle painter, born at Brussels in 1634. He was the scholar of Peter Snayers, and painted some good battles in the style of his master while still very young. Some of these pictures were seen by the French minister Colbert, who invited Vandermeulen to Paris, and held out such hopes to him that he was induced to leave his own country and settle in the French capital, where he was allowed a pension of 2000 francs by Louis XIV., besides being paid handsomely for his works. His pension was afterwards increased to 6000 francs.

Vandermeulen accompanied Louis XIV. to the Netherlands in some of his campaigns, and made drawings of all the fortified places visited by the king or his army, and of all the sieges, battles, and engagements in which he was successful. The pictures painted from these designs are highly valued both for their faithful representation of the localities and for their correct costume. He excelled also in horses, which he designed with great spirit. His execution was free and his colouring generally rich, but his landscapes are rather too green in tone: his handling is in the style of Van Uden and Wildens.

Vandermeulen's principal works, twenty-nine in number, were in the Château de Marly. There are now many of them in the Louvre and many others at Versailles. These pictures are mostly of a large size: they were dead-coloured from his designs by his scholars, Martin the elder, Baudouin, and Bonnart, but were all finished by himself. The best are views of Luxembourg and Fontainebleau, the Entrance of Louis XIV. into Arras, Dinant, and another city, and the Passage of the King over the Pont-Neuf.

Vandermeulen was a member of the highest class of the French Academy. He was the friend of Le Brun, and after the death of his first wife he married a niece of that painter, who by her misconduct is said to have sent her husband prematurely to the grave. He died at Paris in 1690. Many of his pictures and designs have been engraved; the prints after his works amount to nearly one hundred and forty.

Peter Vandermeulen, the brother of Charles Antony, ainted some battles for William III. of England: he came o this country in 1670. He was originally a sculptor.

(D'Argenville, *Abrégé de la Vie des plus fameux Peintres*, &c.)

VANDERMONDE, a French mathematician and philosopher, was born in Paris, in 1735, and during his childood, his health being delicate, his father, a physician of andrecies, caused him to be early taught to sing, in the hope that, by the exercise of his voice, his lungs might cquire strength.

When he was thirty years of age he was introduced o Fontaine, in whose society he felt so much pleasure hat he became his pupil, and immediately applied all the owers of his mind to the study of mathematics. In this he appears to have succeeded so far, that on being recommended by his friend Dusejour to propose himself as a candidate for admission to the Académie des Sciences, he prepared a memoir on the resolution of algebraic equations, which he read at a sitting of that learned body in 1771. Having been elected, he subsequently presented several other memoirs on mathematical subjects: among hese may be mentioned one entitled 'Recherches analyiques sur les Irrationelles d'une nouvelle espéce,' and another on the elimination of unknown quantities.

Vandermonde had always a decided taste for music, and during several years he made it a particular object of tudy. Having analysed the works of the best musicians of the time, he came to the conclusion that the whole art was founded on one general law, by which, with the aid of mathematical processes, it would be possible for any peron to become a composer; and he explained the nature of his method before the Académie in 1788, and again in 1790. His two mémoires were submitted to the consideration of certain members who were appointed to examine hem; and though a favourable report was made by Glück, Philidor, and Piccini, the opinions were not unanimous: the mathematicians are said to have found in the mémoires too much music, and the musicians too much mathematics.

The versatility of his taste and talent led Vandermonde next to the study of chemistry; and becoming connected with Lavoisier, Monge, and Berthollet, he was engaged for a time in making experiments on the gases and on the composition of iron and steel.

After the death of Vaucanson, Vandermonde was appointed to the direction of a conservatory or museum for arts and manufactures which had been formed by that philosopher; and considering it as a collection which might be made highly useful to the country, he spared no pains or expense to augment it with models of all the different machines which he could procure. This was the original of the 'Conservatoire pour les Arts et Métiers,' which was afterwards removed to the Abbaye St. Martin.

From a conversation with M. Senovert, the translator of Stewart's 'Philosophy of the Human Mind,' he was induced to study that branch of science; and applying himself to it with his usual ardour, he was soon above the level of his countrymen in his knowledge of that intricate subject. On the formation of the Ecole Normale he was appointed, in 1795, professor of political economy in that institution, and in the same year he was appointed to the first class of the 'Institut.'

At the breaking out of the Revolution Vandermonde entered into the clubs which were then formed, purely, it is said, as a philosopher, that he might study the characters of the men who distinguished themselves in those turbulent times, and without taking any active part in the measures which were then put in practice.

He exhausted his private fortune in advancing the objects of the museum which had been committed to his care; and being paid, like other public functionaries, in assignats, the depreciation of these reduced him to poverty. He died of a vomiting of blood, on the 1st of January, 1796.

His works consist only of the mémoires, which are printed in the volumes of the Académie des Sciences. His lively imagination seems to have carried him too rapidly from one subject to another to permit him to acquire a profound knowledge of any; and thus the reputation which he acquired during his life may be said to have terminated at his death, or to have survived only for a time in the memory of his friends.

VANDER VELDE, ADRIAN. This celebrated painter was born at Amsterdam in 1639, and showed great ability for drawing at an early age. He became the scholar of John Wynants, with whom he remained some years. Adrian Vandervelde excelled in landscapes, in cattle, and in small figures, and was of great assistance to many of the most distinguished painters of his time by embellishing their pictures with figures, and thus adding greatly to their value. He painted figures in the pictures of Wynants, Vander Heyden, Ruysdael, Hobbema, Moucheron, and others. Vandervelde executed likewise some historical pieces, in which he was very successful; he painted a Taking down from the Cross, for a Roman Catholic church at Amsterdam, in which the figures, though less than life, were of a considerable size; and he left several other works of a similar description unfinished at his death in 1672, in only his 33rd year. Considering the early age at which he died, his pictures are very numerous, yet they are sold for very high prices.

Adrian Vandervelde was well acquainted with the human figure, and also with everything else that he painted. He was extremely industrious, and was constant in his recourse to nature in the studies of all his works: the various effects of light upon the trees and other objects of his landscapes, both in the morning and evening scenes, are remarkably true to nature, and are managed with perfect mastery of his materials. He is distinguished also for the extreme delicacy of drawing of all the objects which he represented.

VANDER VELDE or VANDEVELDE, WILLIAM, called the Old, to distinguish him from his son of the same name, a very celebrated marine painter, was born at Leyden in 1610. Of his early studies little is known, but he appears as a boy to have been bred to the sea; and it was during the voyages of his youth that he acquired his love for the sea and his knowledge of ships, which was eventually of such eminent service to him as a marine painter. He distinguished himself early by some drawings of sea-fights, and he was in consequence commissioned by the States of Holland, in 1666, to accompany admiral De Ruyter on board the Dutch fleet, for the purpose of making designs of whatever engagements might take place between the Dutch and English fleets. He made some admirable drawings of the great engagement which took place off Ostend, in June of that year. By these and other designs he acquired such a reputation that he was invited in 1675 to England by Charles II., who granted him a pension of 100*l.* per annum, with the title of painter of sea-fights to the king. He is said to have been so zealous in the service of Charles, as to be ungrateful to his country: he led the English fleet to burn Schelling.

Vandevelde did not paint his designs: they were generally executed with a pen upon paper fixed upon canvas, upon parchment, or upon white prepared canvas; he also executed some in black and white: every part is drawn and made out with a knowledge and precision unrivalled in that style. Some of his designs were painted in oil by his son, who lived with him in this country, and received from the king also a pension of 100*l.* per annum for that express purpose. A copy of the following privy-seal was purchased among the papers of Pepys, and was given by Dr. Rawlinson, the antiquary, to Vertue, the engraver:—'Charles the Second, by the grace of God, &c., to our dear cousin, prince Rupert, and the rest of our commissioners for executing the place of lord high-admiral of England, greeting. Whereas we have thought fitt to allow the salary of one hundred pounds per annum unto William Vandevelde the elder, for taking and making draughts of sea-fights; and the like salary of one hundred pounds per annum unto William Vandevelde the younger, for putting the said draughts into colours for our particular use; our will and pleasure is, and wee do hereby authorise and require you to issue your orders for the present and future establishment of the said salaries to the aforesaid William Vandevelde, the elder, and William Vandevelde, the younger, to be paid unto them and either of them during our pleasure; and for so doing these our letters shall be your sufficient warrant and discharge. Given under our privy-seal at our pallace of Westminster, the 20th day of February, in the 26th year of our reign.' After the death of Charles, James continued the pension.

He witnessed many of the fights that he drew: he attended the engagement at Solebay in a small vessel by order of the duke of York. He died in London and was buried in St. James's Churchyard; the following inscription was engraved on his tombstone:—'Mr. William Vandevelde, senior, late painter of sea-fights to their majesties King Charles II. and king James, dyed 1693.'

VANDER VELDE, WILLIAM, the Younger, was greatly superior to his father, and is accounted the best marine-painter that ever lived. He was born at Amsterdam in 1633, and was taught by his father until he came to England, when he was placed with Simon de Vlieger, a clever ship-painter. Young Vandervelde came early to this country, and lived probably with his father at Greenwich: he died in London in 1707. The works of the younger Vandervelde are very valuable: the best of them are in England. His calms and his storm-pieces are equally excellent, and they are all remarkable for their delicacy of drawing and transparency of colouring. Walpole says of him, 'William Vandevelde, the son, was the greatest man that has appeared in this branch of painting; the palm is not less disputed with Raphael for history, than with Vandevelde for sea-pieces. Annibal Caracci and Mr. Scott have not surpassed those chieftains.'

The younger Vandervelde left a son of the same name, who also painted sea-pieces, and made good copies of the works of his father. He died in Holland. Both the Vanderveldes sat to Sir Godfrey Kneller.

(Houbraken, *Groote Schouburgh*, &c.; Descamps, *La Vie des Peintres Flamands*, &c.; Walpole, *Anecdotes of Painting in England.*)

VANDER WERFF, ADRIAN. This celebrated painter was born of a good family at Kralinger Ambacht near Rotterdam, in 1659. He studied first with Cornelius Picolett, a good portrait painter, but at the age of thirteen was placed with Eglon Vander Neer, with whom he remained four years, and made such progress as to render his master great assistance in his works. At the early age of seventeen Vander Werff set up for himself as a portrait painter at Rotterdam. He painted small portraits in oil, in the style of Netscher: he however soon got tired of this branch, and took to historical painting; and he was remarkably successful in disposing of his first pictures. Perhaps no painter ever rose more steadily to fortune than Vander Werff; every year added to his wealth and to his reputation. He painted a picture for an East India merchant of the name of Steen at Amsterdam, where he had been with his master Vander Neer, which was apparently the making of his fortune. It attracted the attention of and was purchased by the elector John William of the Pfalz, when passing through Amsterdam; and when that prince was at Rotterdam in 1696, he visited Vander Werff, and orderd two pictures of him: his own portrait, for the grand-duke of Tuscany, and a Judgment of Solomon, which pictures he requested Vander Werff to bring to him in person to Düsseldorf, in the following year. Vander Werff took the pictures, and the elector was so well satisfied with them, that he wished to take the painter into his service, and offered him a noble salary: Vander Werff however consented to give up only six months in the year to the elector, and was allowed a salary of 4000 florins, but it was raised to 6000 upon his afterwards consenting to devote nine months in the year to the prince, who presented him with his portrait set in diamonds, and honoured him with knighthood for him and his heirs. He purchased also at a high price the works which Vander Werff executed during the remaining three months of the year.

Vander Werff received very high prices for his pictures. After the death of the elector in 1716, he was at liberty to dispose of them to whom he pleased; and in the following year, 1717, he sold three to one nobleman for 10,000 florins, a Judgment of Paris for 5500 florins, a Holy Family for 2500 florins, and a Magdalen for 2000 florins. In the year after he sold another Judgment of Paris for 5000 florins, and a Flight into Egypt for 4000 florins: shortly afterwards he sold to an English gentleman ten pictures for 33,000 florins; and after his death, a painting of the Prodigal Son was sold for 5500 florins. He died in 1722.

The pictures, or the greater part of them, painted by Vander Werff for the elector John William, which formed part of the Düsseldorf collection, are now in the Pinakothek at Munich, where there are twenty-nine paintings by Vander Werff, including the Fifteen Mysteries of the Roman Church, and many of his best pieces. The Ecce Homo, containing many small figures, painted in 1698; Abraham with Sarah and Agar, painted in 1699; and a Magdalen in the Wilderness, painted in 1707, are remarkable works, equally excellent in composition, drawing, colouring and execution, and are perhaps unequalled for their delicate and elaborate finish; yet through an artificial chiaroscuro they have a cold and inanimate effect, which greatly detracts from the gratification the spectator might be expected to experience in contemplating such exquisite works of art. Sir Joshua Reynolds saw most of these works at Düsseldorf before the collection at that place was purchased by the late king of Bavaria, and in his 'Journey to Flanders and Holland' he has made some remarks on these pictures, which define admirably the beauties and defects of this painter. He says:—'His pictures, whether great or small, certainly afford but little pleasure. Of their want of effect it is worth a painter's while to inquire into the cause. One of the principal causes appears to me, his having entertained an opinion that the light of a picture ought to be thrown solely on the figures, and little or none on the ground or sky. This gives great coldness to the effect, and is so contrary to nature and the practice of those painters with whose works he was surrounded, that we cannot help wondering how he fell into this mistake. In describing Vanderwerf's manner, were I to say that all the parts everywhere melt into each other, it might naturally be supposed that the effect would be a high degree of softness; but it is notoriously the contrary, and I think for the reason that has been given; his flesh has the appearance of ivory or plaster, or some other hard substance. What contributes likewise to give this hardness, is a want of transparency in his colouring, from his admitting little or no reflection of light. He has also the defect which is often found in Rembrandt, that of making his light only a single spot. However, to do him justice, his figures and his heads are generally well drawn, and his drapery is excellent; perhaps there are in his pictures as perfect examples of drapery as are to be found in any other painter's works whatever.'

(Houbraken, *Groote Schouburgh der Nederlantsche Konstschilders*, &c.)

VANDER WEYDE, ROGER, a celebrated old painter of Brussels, born in the latter part of the fifteenth century. He was, according to Van Mander, one of the first to reform the style of design of the Flemish painters; he divested it considerably of its Gothic manner, was correct in his proportions, and was very successful in expression. He painted portrait and history: there are, or were, four very celebrated pictures by him in the town-hall of Brussels, illustrating remarkable acts of justice. One represents a father on his death-bed putting to death his guilty son; another account describes it as Archambald, prince of Brabant, putting his nephew and heir to death, for having violated a maid of that country: the expression of sorrow in the face of the old man is said to be excellent.

There was also in a church of the Virgin at Louvaine a Descent from the Cross, by Vander Weyde, which was highly valued. It was sent to Spain by command of the king of Spain, and a copy of it, by Michael Cocxis, put up in its place at Louvaine. Vander Weyde died in 1529, in the prime of life, of an epidemic disease which carried off many people. Van Mander says that he amassed considerable wealth, and spent much on the poor. Two heads, on gold grounds, in the gallery of the Louvre, one of Christ and the other of the Virgin Mary, numbered 515 and 516 and said in the catalogue to be by an unknown artist, are, according to Dr. Waagen (*Art and Artists in Paris*), by the hand of Vander Weyde. He praises the expression and the colouring.

(Van Mander, *Het Leven der Schilders*; Waagen, *Kunstwerke und Künstler in England und Paris.*)

VAN DIEMEN'S LAND. [TASMANIA.]

VANDYCK, SIR ANTONY. This great painter was born at Antwerp, March 22nd, 1599. His father was a glass-painter of Hertogenbosch (Bois-le-Duc), and gave his son his earliest instruction in drawing; he was instructed also by his mother, who painted landscapes, and was very skilful in embroidery. Before he became the scholar of Rubens, Vandyck is said to have been placed with Van Balen. With Rubens he made such progress as to be soon intrusted with the execution of some of his master's sketches, and, according to a common but probably incorrect report, to excite his jealousy. Rubens has had the credit of having been actuated by jealousy when he ad-

ised Vandyck to confine himself to portrait painting, and *visit* Italy for the purpose of studying the works of tian and other great Italian masters. Walpole enter- ined a more rational view: he supposes that Vandyck elt the hopelessness of surpassing or even equalling his reat master in his own line, and that he voluntarily evoted his chief attention to portrait. If Rubens recommended Vandyck to visit Italy, it was clearly for Vandyck's enefit, and his following that advice shows that he saw ully the advantages to be derived from such a visit, of which Rubens himself was an excellent example. The mmediate cause of Rubens's reputed jealousy of his scholar s accounted for by a variously-told anecdote. Diepenbeck, another of Rubens's scholars, is said to have been pushed by one of his companions against the great picture of the Descent from the Cross, upon a part that was still wet, and to have done it considerable damage, which was however so well repaired by Vandyck, that Rubens is reported to have been at first better pleased with that part of the picture after the accident than before it; but upon the circumstance being related to him, to have become ealous of Vandyck, and to have repainted the part again himself. Another version of the story says that this accident increased his esteem for Vandyck. Whatever may be the real statement of the case, Rubens and Vandyck ppear to have parted on the best of terms. Vandyck presented Rubens with two historical pictures, an Ecce Homo and Christ in the Garden of Olives, and a portrait of Rubens's second wife: he was presented in return by Rubens with one of his most beautiful horses.

At the age of twenty Vandyck set out for Italy, but de- ayed some time at Brussels, fascinated by the charms of a peasant girl of Savelthem, who persuaded him to paint two pictures for the church of her native place—a St. Martin on horseback, painted from himself, and the horse given him by Rubens; and a Holy Family, for which the girl and her parents were models. In Italy he spent some time in Venice and in Genoa, where he painted many excellent portraits. From Genoa he went to Rome, where he was also much patronized, and lived in great style. A portrait of Cardinal Bentivoglio, painted at this time, is one of his masterpieces: it is in the Pitti Palace, and hangs near the celebrated portrait of Leo X. by Raphael, and is in every respect an admirable picture. Vandyck was known in Rome as the Pittore Cavalieresco. He avoided the society of his countrymen, who were men of low and intemperate habits. They had formed themselves into a well-known society called the Schilder-Bent, and annoyed Vandyck so much that he was obliged to leave Rome and return to Genoa about 1625. Germans were also admitted into this society: it was not broken up until the year 1720. Whilst at Genoa Vandyck received an invitation to go to Palermo; whither he went, and he painted there portraits of Prince Philibert of Savoy, the viceroy, and other distinguished persons; also the celebrated painter Sophonisba Anguisciola, then in her 92nd year. He remained only a hort time in Sicily, being driven away by the plague. He eturned to Genoa, and thence to his own country.

Vandyck's first picture after his return to Antwerp was St. Augustin, for the church of the Augustines in that place, by which he established his reputation as one of the rst painters of his time. He painted several other excellent historical pictures, but acquired greater fame by his portraits. He was in high favour with his old master Rubens, who is said to have offered him his eldest daughter in marriage, but Vandyck declined upon the plea that he intended o return shortly to Rome, or really, as some say, because he was in love with the step-mother. From Antwerp Vandyck went to the Hague by the invitation of the prince of Orange, Frederick of Nassau, and painted many portraits f the principal personages at that court. Whilst at the Hague he heard of the great love of the arts of Charles I., nd he came to England with the hope of being introduced to the king. His hopes not being realized, he went to Paris, and not being more successful in that place, he returned to his own country. Charles however, having hortly afterwards seen the portrait of the musician Nic. aniere, director of the music of the king's chapel, requested Sir Kenelm Digby, who had sat to Vandyck, to invite him to come again to England. He came to England bout 1632; was lodged by the king at Blackfriars; was nighted in that year, and in the year following, 1633, he was granted an annual pension of 200*l*. for life, with the title of painter to his majesty, besides being handsomely paid for his works. There is a note in Walpole of a sum of 280*l*. paid to Vandyck by the king, for various pictures in 1632. For a simple whole length the king paid 25*l*., but other people appear to have paid more. Walpole says, 'Vandyck had 40*l*. for a half, and 60*l*. for a whole length; a more rational proportion than that of our present painters, who receive an equal price for the most insignificant part of the picture.'

Vandyck was indefatigable in his application; he painted a portrait in a day. He often detained people who sat to him to dinner, that he might have an opportunity of studying their countenances, and he retouched their portraits again in the afternoon. He kept a great table, and was of most expensive habits; he was also fond of music, and was liberal to musicians. In the summer he lived at Eltham in Kent. Buckeridge, in his 'Essay towards an English School,' speaking of Vandyck, says, 'He always went magnificently dressed, had a numerous and gallant equipage, and kept so good a table in his apartment, that few princes were more visited or better served.' This luxurious and sedentary life destroyed his constitution and wasted his means. He endeavoured to repair his fortunes by the absurd study of alchemy and the search of the philosopher's stone: a pursuit in which he was probably encouraged, says Walpole, by the example of his friend Sir Kenelm Digby. Shortly before he died, the king bestowed on Vandyck, for a wife, Mary, daughter of the unfortunate Lord Ruthven, earl of Gowry. Not long after they were married, he went with his wife to Paris, 'in hopes,' says Walpole, 'of being employed in some public work;' but after remaining there for a short time, and seeing no prospects of success, he returned to London, and, still bent upon executing some public work, he proposed to the king, by Sir Kenelm Digby, to paint the walls of the Banqueting-house at Whitehall with the history and procession of the Order of the Garter. He made a design, with which the king is said to have been pleased, but he demanded such a large sum for the carrying it into execution (80,000*l*., probably a misprint for 8000*l*.), that it was judged unreasonable; and whilst the king was treating with him for a less sum, the project was put an end to by the death of Vandyck: he died in London, in 1641, in the 42nd year of his age; and was buried in St. Paul's Cathedral, near the tomb of John of Gaunt. He left one daughter by his wife Mary Ruthven, who married Mr. Stepney, who rode in the horse-guards on their first establishment by Charles II. Notwithstanding his expensive habits, he died worth about 20,000*l*.

Vandyck is generally allowed to dispute the palm with Titian in portrait painting, and he is by some accounted upon the whole superior to him. He was inferior to Titian in richness and warmth of colouring, but surpassed him in perhaps every other respect. Vandyck is unrivalled for the delicacy of drawing and beauty of his hands; he was perfect master of drawing and of chiaroscuro; he was admirable in draperies; and with simplicity of expression and grace of attitude, he combined both dignity and individuality. His portraits generally impress us with the feeling that he has not only selected the most suitable attitude for the figure, but that he has also chosen the best view of the countenance. His latest works are executed in a careless though masterly manner, but some of his earliest portraits, particularly some of those painted in Italy, combine with his own masterly style of design the exquisite finish of Holbein.

Although Vandyck has acquired his great name by his portraits, he painted also many excellent historical pieces, and he never at any time ceased to paint pictures in this line; they are however very inferior to his portraits: they want generally both feeling and expression. His best historical picture, in the opinion of Sir Joshua Reynolds, is the Crucifixion between the two Thieves, at the church of the Recollets at Mechlin, of which he says, 'This perhaps is the most capital of all his works, in respect to the variety and extensiveness of the design, and the judicious disposition of the whole. In the efforts which the thieves make to disengage themselves from the cross, he has successfully encountered the difficulty of the art; and the expression of grief and resignation in the Virgin is admirable. This picture, upon the whole, may be considered as one of the first pictures in the world, and gives the highest idea of Vandyck's powers: it shows that he had truly a genius for history-painting, if it had not been taken off by portraits.

Vandyck's pictures are very numerous, almost as much so as those of Rubens. Many of the best of them are in this country, at Windsor Castle, at Hampton Court, at Wilton House, and at Blenheim, and in many other private collections. His masterpiece, in the opinion of Walpole, is the dramatic portrait of the Earl of Strafford and his secretary Sir Thomas Mainwaring, at Wentworth House. There is one also at Blenheim of this subject, which Dr. Waagen praises very highly; Walpole however says that the picture at Wentworth House is infinitely superior to it. At Wilton House there are twenty-five pictures by Vandyck, and it is here, says Walpole, that Vandyck is upon his throne; and the great portrait of Philip, earl of Pembroke, with his family, says the same writer, 'though damaged, would serve alone as a school of this master.' Charles I. was painted several times by Vandyck, sometimes on horseback, and he repeated some of the portraits of him: they are among his best works. Among his more interesting works also is the series of portraits of the most eminent artists and others his contemporaries at Antwerp, painted in small in chiaro'scuro, before he left Antwerp for the Hague. The originals were never collected, but they were etched and have been published together, to the number of one hundred, three times, under the following titles—'Icones Virorum doctorum, pictorum, chalcographorum, &c. numero centum, ab Antonio Vandyck pictore ad vivum expressæ et ejus sumptu æri incisæ Antverpiæ.' Vandyck etched some of the plates himself.

The superb head of Gevartius, as it is called, in the National Gallery in London, attributed to Vandyck, is supposed by some critics to have been painted by Rubens. Passavant and Dr. Waagen are both of this opinion, but they think that the rest of the picture is the work of Vandyck. Dr. Waagen has observed that this picture cannot be the portrait of Caspar Gevartius, the friend of Rubens, for he was not born until 1593, and it represents a man between 50 and 60; and that if it represents the canon John Gevartius, it cannot have been painted by Vandyck, for he died in 1623, whilst Vandyck was in Italy; nor can it have been painted by him before he went to Italy, for it is not the production of a young hand. If it be the head of John Gevartius, it must have been painted by Rubens.

(Houbraken, *Groote Schouburgh*, &c.; Descamps, *La Vie des Peintres Flamands*, &c.; Walpole, *Anecdotes of Painting in England;* Passavant, *Kunstreise durch England und Belgien;* Waagen, *Kunstwerke und Künstler in England und Paris.*)

VANE, SIR HENRY, the Younger, was born about the year 1612. He was descended from an antient family in the county of Kent, and was the eldest son of Sir Henry Vane of Hadlow in Kent, knight, comptroller of the household and secretary of state to King Charles I. He received the first part of his education at Westminster School. About the sixteenth year of his age Sir Henry Vane became a gentleman commoner of Magdalen Hall, Oxford: but Wood says, that when he should have matriculated as a member of the University, and taken the oaths of allegiance and supremacy, he quitted his gown, put on a cloak, and studied notwithstanding for some time in that hall. On leaving Oxford he spent some time in France, and more in Geneva, where he contracted an unconquerable aversion towards the government and liturgy of the Church of England. After his return home, his father, being then comptroller of the household and a privy councillor, was greatly displeased on discovering the heterodox state of his son's opinions. The interference of Laud in the work of recalling him to the doctrines of the Church of England produced the effect of confirming him in his sectarianism. In 1635 he went, for conscience sake, to the infant colony of New England, where he remained about two years. On his return to England he married; and, through his father's interest, was joined with Sir William Russell in the office of treasurer of the navy. In 1640 he was knighted. He sat for the borough of Kingston-upon-Hull in the parliament which met at Westminster, April 13, 1640, and again in the Long Parliament, which began November 3, the same year. During Strafford's trial young Vane, in searching for some papers for his father, found in his father's cabinet some notes, which were used as material evidence against Strafford on the trial. Having been appointed sole treasurer of the navy, and considering the fees, which by reason of the war amounted to nearly 30,000*l.* a year, as too much for a private subject, he gave up his patent, which he had for life from Charles I., to the parliament, only desiring that 2000*l.* a year should go to a deputy whom he had bred to the business. When the Independents sprang up, he declared himself one of their leaders. He did not approve of the force put upon the parliament by the army, nor of the king's execution, withdrawing for some time from public affairs.

Upon the establishment of the Commonwealth, in February, 1648-9, he was appointed one of the council of state, and in 1652 he was for a time president of the same council, and also at the same time one of the commissioners of the navy. On the 9th of January, 1649-50, he made the Report to the House of Commons from the Committee appointed to consider of the manner of electing future Parliaments. Towards the end of 1651 he was nominated one of the commissioners that were to be sent into Scotland in order to introduce the English government there.

Vane was one of those who would not submit to the usurpation of Cromwell. When Lieutenant-Colonel Worsley entered the House of Commons, on the 20th of April 1653, with two files of musqueteers, to drive out the commons, Vane exclaimed, 'This is not honest! yea, it is against morality and common honesty.' Whereupon Cromwell fell a railing at him, crying out with a loud voice, 'O, Sir Henry Vane! Sir Henry Vane! the Lord deliver me from Sir Henry Vane!' In 1656, as Vane persevered in his hostility to Cromwell's government, which hostility he displayed in a book published by him, entitled 'A Healing Question propounded and resolved,' he was imprisoned for some time in Carisbrook Castle in the Isle of Wight. But notwithstanding this and other means to shake his resolution, he remained inflexible both under Oliver and his son and successor Richard.

After Richard's abdication, the Long Parliament, which had been restored by a general council of the officers of the army, constituted Sir Henry one of the Committee of Safety, and also a member, and afterwards president of the council of state. But he afterwards seems to have fallen under the displeasure of the parliament, for it was voted that he should repair to his house at Raby, and remain there during the pleasure of the parliament.

On the king's restoration, the House of Commons resolved, on the 11th of June, 1660, that Sir H. Vane should be one of the twenty persons to be excepted out of the Act of General Pardon and Oblivion, for and in respect only of such pains, penalties, and forfeitures, not extending to life, as should be thought fit to be inflicted on him. In July he was committed to the Tower. In January 1660-61, an insurrection of the Fifth-Monarchy Men broke out, and Sir Henry Vane, being almost the only person of station who had countenanced them, was removed from one prison to another, and at last to the Isle of Scilly. In August, 1660, the lords and commons had joined in a petition to the king, that 'if he were attainted, yet execution as to his life might be remitted;' to which his majesty returned a favourable answer. But in July, 1661, the commons had so far altered their sentiments as to order that he should be proceeded against according to law, and for that purpose be sent for back to the Tower of London.

On Monday the 2nd of June, 1662, Vane was arraigned, having been indicted of high treason before the Middlesex grand jury the preceding term. He pressed much for counsel, and the court assured him that, after pleading counsel should be assigned him; which assurance, after his pleading *not guilty*, we are informed the court thought fit to violate. On Friday the 6th of June, the attorney-general having addressed the jury, Sir Henry was required to make his defence, and to go through with his case all at once, and not to reply again upon the crown lawyers. Vane spoke in his defence with great spirit and courage. After he had finished, Finch, the solicitor-general, addressed the jury, who, having then retired for about half an hour, returned with their verdict, which found the prisoner guilty of high treason from January 30, 1648 (the day of Charles I.'s execution). On the 11th of June, the sentence-day, the court finally refused to hear his reasons for an arrest of judgment, though they had promised him before the verdict, that they would hear anything of that kind he had to offer; as they had also, before his pleading *not guilty*, promised him counsel. The sentence was, that he should be hanged, drawn, and quartered at Tyburn, but in the order for his execution the manner of his death was altered into a beheading only on Tower Hill, which rder was accordingly carried into execution on the 14th f June.

Sir Henry Vane left only one son, who was knighted by King Charles II., and created, by King William, Lord Barard of Barnard Castle.

Sir Henry Vane was the author of various publications, both political and theological. Of the latter the most emarkable bears the following strange title: 'The Reired Man's Meditations, or the Mysterie and Power of Godlines shining forth in the Living Word, to the unmaskng the Mysterie of Iniquity in the most Refined and Purest Forms. In which Old Light is restored, and New Light justified, being the Witness which is given to this Age. By Henry Vane, Knight,' 4to., 1655, in which, amongst other subjects equally dark, he discusses the creation, nature, and ministry of angels,' 'the tree of knowledge of good and evil,' the 'fall of man,' and 'the housand years' reign of Christ;' which last discussion, though it might be supposed to be the Fifth-Monarchy Man's strong subject, we found the most unintelligible of the whole.

(*The Life and Death of Sir Henry Vane, Knt.*, Lond., 1662; *Biog. Brit.*, art. 'Vane;' *Ath. Oxon.*, art. 'Vane;' Birch's *Lives*; Ludlow's *Memoirs*; *Vane's Speeches* in Brit. Mus.; Whitelock; *Trial of Sir Henry Vane, Knt.*, 1662; *State Trials*, vol. ii.)

VAN EFFEN, JUSTUS, a writer who has been called he Addison of Holland, was born at Utrecht in 1684, and was intended by his father for the same profession as his own, namely, the military service. But Justus felt no inclination for the army: he preferred study, and applied himself to that of jurisprudence, in which faculty he obained a Doctor's degree at Leyden in 1727. He does not however appear to have practised law much as a profession, for he was at first successively employed as private teacher n several families of rank, and afterwards occupied in literary pursuits. In the first-mentioned capacity he was brought into contact with superior society, and had the opportunity of forming advantageous connections, owing to one of which he was appointed to accompany Van Duivenvoorde as his second secretary when he was sent by the States, in 1714, to congratulate George I. on his accession. He afterwards visited England a second time in 1727, in the quality of first secretary to Count Van Welderen, who was then ambassador to this country. On the former of hese occasions he became acquainted with Swift's writings, and translated his 'Tale of a Tub,' not however into Dutch, but into French, which language he wrote as easily as his own, under the title of 'Conte du Tonneau.' On the other, he was elected a member of the Royal Society of London. In 1719 he visited Sweden, in company with a German nobleman, and there received many marks of attention from the highest persons at court. A place of some emolument was bestowed upon him by his patron Van Welderen; but as its duties did not accord with his nclination, he put in a substitute, to whom he gave up a considerable part of the salary, and occupied himself with his pen, not only more congenially, but so successfully as to acquire a high literary reputation.

Many years before (1711) he had published a French work, under the title of 'Le Misanthrope,' upon the plan of our English 'Spectator,' and he now commenced a similar one, but everyway superior to the former. The Hollandsche Spectator,' begun in 1731, and continued till 1735, the year of the author's death, was not only the first attempt of the kind in the language, but has become a classical work. It is stamped by easy elegance of style, by pleasantry, and wit, attempered by judgment and correct *feeling*. Like his English model, Van Effen both instructs and pleases; and if time has deprived their pictures of life and manners of the charm of freshness, it has also imparted to them no little historic value.

(Van Kampen, *Beknopte Geschiednis van der Letteren en Wetenschappen in de Nederlanden.*)

VANELLUS. [PLOVERS, vol. xviii., p. 284.]

VANGA, a genus of INSESSORES, or Perching Birds, placed by Mr. Vigors among the *Laniadæ*, and by Mr. Swainson among the *Corvidæ*. [SHRIKES, vol. xxi., pp. 415, 417.]

VANGUE'RIA, a genus of plants of the natural family of Rubiaceæ, which has been so named from an alteration of its vernacular name, *vou vanguer*, in Madagascar. The genus is characterised by having the limb of its calyx spreading, 5-toothed, and deciduous. The corol is short, campanulate, 5-cleft, hairy in the throat, lobes lanceolate, reflexed. Stamens 5, with short filaments, and oblong, hardly exserted anthers. Stigma capitate, berry apple-shaped, marked at the apex by a furrowed areola, from which the limb of the calyx had separated, containing five bony 1-seeded nuts. The species are few in number: of which the principal are V. edulis of Madagascar, and the Indian V. spinosa. Both species form small trees or shrubs, having ovate or oblong petiolate leaves, with lanceolate stipules, solitary on both sides. Cymes branched, somewhat panicled, axillary, or from the cicatrices of the fallen leaves; corolla greenish-white. The fruit of the V. edulis is eaten by the natives of Madagascar and of the Mauritius, where it has been introduced, as well as into the Peninsula of India. V. spinosa, the Mayna of the natives of Bengal, but which is found in many parts of the plains of India, is a distinct species, though united to the above by Sprengel, in his 'Syst. Vegetabilium.' It is said to be also found in China. The fruit is eaten by the natives of India.

VAN HELMONT, SEGRES JACOB, a Flemish historical painter, born at Antwerp in 1683. He was the son of Matthew Van Helmont, a painter of Brussels, and was instructed in his art by his father: he followed however a very different line. The father painted markets, fairs, shops, alchemists at work, and similar scenes: the son distinguished himself for religious compositions in the great style. The younger Van Helmont settled at Brussels: he was of a weak constitution, and never left his own country. He excelled in composition and in colouring, and was considered one of the best Flemish painters of his time. He painted many works for the churches and for private persons at Brussels. Descamps has enumerated many of his works. The Triumph of Elijah over the Priests of Baal, in the church of the Carmelites; the Martyrdom of St. Barbara, in St. Mary Magdalen; and the Triumph of David, in St. Michael's church, at Brussels, are considered his masterpieces. He died at Brussels in 1736, aged 53.

(Descamps, *La Vie des Peintres Flamands*, &c.)

VAN HELMONT. [CHEMISTRY.]

VANILLA, a genus of plants, the type of Lindley's natural order Vanillaceæ.

The name is derived from *vaynilla*, a diminutive of *vayna*, which in Spanish signifies a knife or scissor case, the fruit being long and cylindrical, and like the sheath of a knife. The species are generally supposed to be confined to Brazil, Guyana, and the West Indies, but several have been described by Schiede from Mexico. Species have also been found in Penang, Singapore, and Java. *V. aphylla* of Blume, found in Java, appears to Dr. Lindley to be the same with specimens found by Dr. Wight in the Peninsula of India. As the greater portion and the finest kinds of the Vanilla of commerce are imported from Vera Cruz, the most important species must be natives of Mexico. These have been described by Schiede, in 'Linnea,' vol. iv., p. 573; but the accounts are too imperfect for Dr. Lindley, the best authority in this family of plants, to characterize the species satisfactorily. Schiede states that his *V. sativa*, which is called by the Mexican Spaniards *Baynilla-mansa*, and of which the Vanilla is considered the finest of all, grows wild and is also cultivated in Papantla, Misantla, Nautla, and Colipa. *V. sylvestris*, the *Baynilla cinnamona* of the natives, which is found wild in the same districts, has its fruit mixed with that of *V. sativa* when gathered. *V. Pompona*, of which the specific name is adopted from the vernacular name in Mexico, has the fruit the largest of all; rich in essential oil having a very agreeable odour; but as it always remains soft, instead of drying, it cannot be transmitted to Europe as an article of commerce. Dr. Lindley is of opinion that the two first of these species have been probably confounded with *V. planifolia*. *V. aromatica*, which is the species usually adduced as yielding the vanilla of commerce, is a native of mountainous parts of Brazil, has been found near Rio Janeiro, and also in the province of Minas Geraes; but it does not appear that any of the Brazilian vanillas form the substance known in trade. A kind of vanilla is said to be preserved in sugar in Brazil, and used in the country, or occasionally sent to Lisbon, but it is not fit to dry for the purpose of commerce.

(Lindl., *Orchid.*, p. 434.) Aublet says there are three kinds of vanilla in Cayenne, one of which, as it agrees with Plumier's figure, t. 188, is no doubt V. aromatica; another (la petite Vanille) has the pods only three inches long, by an inch and a half in diameter, and must be a very different species; while the third, or *grosse vanille*, is not described. The Indians propagate the vanilla by planting cuttings at the foot of trees selected for the purpose, up which the trailing stems of the plant may climb. The best accounts of the cultivation have been given by Aublet, in his 'Plantes de la Guiane Française,' vol. ii., p. 77, Append.

The name Vanilla was given to this genus by Plumier, and though barbarous, according to Linnæan principles, its euphony has preserved it from rejection, even amongst decided purists. The species of this genus are climbing plants, but are not epiphytic, as many of the Orchidaceæ, although in climbing up trees they put forth roots as holdfasts, which are capable of absorbing nutriment for the plant when other modes of supply are cut off. The leaves are fleshy, subcordate at the base, and articulated with the stem. The stem is square, and frequently climbs to a height of 20 or 30 feet. The flowers are fleshy. The perianthium is articulated with the ovarium, and frequently caliculated. The sepals and petals are nearly equal, conformed and free at the base. The labellum is entire, connate with the column, concave and barbed in the middle. The column is elongated and apterous. The anthers are terminal and opercular. The pollen-masses are two, bilobed and granulose. The fruit is siliquiform, fleshy, and dehiscing at the side. The placentæ, from 3 to 6, covered with seeds. The seeds are globose, and covered with a closely adnate testa.

Lindley enumerates eight species as belonging to this genus, two of which have been found in Asia and six in America. The fruits of most of them are aromatic, and on this account have formed a considerable article of commerce from their consumption as a luxury.

V. aromatica, Aromatic Vanilla, has ovate, oblong, acuminate sessile leaves; perianth campanulate with five undulated acuminate laciniæ; the labellum acuminate, cucullate at the base, with an elevated naked middle line. This species is the *Epidendrum Vanilla* of Linnæus, and is a native of Brazil, and was supposed at one time to yield all the Vanilla of commerce. Under this name have been included two or three species of Vanilla, one of which alone is probably the only species that yields Vanilla.

V. claviculata, Tendril-bearing Vanilla, has lanceolate acute, concave, recurved, rigid leaves; aggregate flowers; ovato-lanceolate, fleshy, obtuse, concave sepals; ovato-lanceolate obtuse petals; the limb of the labellum ovate, dilated, deflexed; the fruit oblong and insipid. This plant is a native of the Antilles in woods, and in the mountainous inland parts of Jamaica. The stem climbs to the height of 20 or 30 feet, and appears as if jointed at the insertion of each leaf, from a slight swelling. Its fruit has no aroma. It is called by the negroes Green-with, and they use a decoction of the plant in syphilitic complaints.

V. grandiflora, Large-flowered Vanilla, has a short many-flowered spike, with broad, round, striated bracts; elongated, straight, smooth, oblong petals and sepals; the limb of the labellum with short, cuneate, dentated lamellæ at the base. This plant is a native of French Guiana, and, Lindley supposes, may produce some of the Vanilla of commerce.

V. planifolia, the Fragrant Vanilla, resembles the last species. It has oblong-lanceolate, flat, slightly nerved leaves, with uniform petals and sepals, and a fringed, abrupt, tuberculated labellum. Under this name have been described, according to Morren, several species of Vanilla, and he thinks it probable that the plant that was originally cultivated in Great Britain as *Vanilla aromatica* belonged to this species. This plant is a native of Mexico and several parts of South America, and is also stated by Royle to be an inhabitant of the East Indies. It was introduced into this country by the duke of Marlborough in 1800. From the gardens of Great Britain it made its way to those of the Continent, and from Holland it was sent to Japan, where it is now much cultivated. But this plant very rarely flowered, and never produced fruits in Europe, and therefore it was never suspected to be the plant that yielded the vanilla of commerce; but recently, M. Morren, of Liege, has succeeded in obtaining abundance of fruit from this plant, and, from their character, there is little doubt that they are the same as those brought from America.

The Vanilla was not known in Europe till after the discovery of America. When the Spaniards discovered America, the Indians were in the habit of using the vanilla for the purpose of flavouring their chocolate. As chocolate became an article of use in Europe, a demand was made upon America for vanilla, although little or nothing was known of the plant that produced it till [illegible] when it was described by Plumier. At the present day it forms an important article of export with the Mexicans, amounting to 30,000 or 40,000 dollars annually.

The fruit is the only part of the plant that is used. It has a balsamic odour, and a warm agreeable flavour. To these properties it is indebted to a peculiar volatile oil and to a considerable quantity of benzoic acid. When the fresh fruits are opened, they contain a black, oily, balsamous liquid, in which an infinite number of small granules are seen floating. Before the fruit comes into the market it undergoes a preparation, by which it is rendered dry. According to Aublet, the fruit is gathered when it gets yellow, and it is first allowed to ferment for two or three days: it is then laid in the sun to dry, and when about half dried it is rubbed over with the oil of palma Christi or the oil of cocoa: it is again exposed to the sun to dry, and oiled again a second time. The fruit is then collected in small bundles, and wrapped up in the leaves of the Indian reed. Neither in Guiana nor in Mexico is the vanilla-plant cultivated, but the fruit is collected by the natives, who sell it to the Europeans. There are four sorts known in European markets, and varying in price according to their qualities: they are called, in Spanish, *Vanilla fina*, *zacate*, *rezacate*, and *vasura*.

In France, and very generally on the continent of Europe, vanilla is used for the purpose of giving flavour to cakes, sweetmeats, liqueurs, lemonade, and more especially chocolate. It acts as a slight stimulant on the system, and where there is a want of energy and activity in the system it becomes a valuable adjunct to various articles of food. As a medicine it is seldom given, but it possesses properties that might render it available for the relief of many diseases. The fact of its possessing benzoic acid is worthy of attention, now that we have evidence of the utility of that agent in acting chemically upon the secretions of the kidneys.

Hitherto Europe has been entirely dependent on America for a supply of vanilla; but Professor Morren of Liege has recently demonstrated that vanilla fruits of the finest quality may be grown in Europe. The species with which he succeeded in obtaining this result was the *V. planifolia*, a plant that seldom flowers in Europe at all. This Morren attributes to the plants not being allowed to grow in lofty humid houses, and to their being too young and small. In order to flower plants, they should be at least 5 or 6 years old. They should be placed in a house where they may be shaded, and have heat and moisture. The best soil for them is burnt coal (coke) laid over with some light wood crushed to small pieces, as birch or poplar. They must be freely watered, and allowed to creep up an iron frame or other support. The branches should be twined, and their extremities cut, and burned with a hot iron in order to stop the flow of the sap, and thus stimulate the flowers. It flowers in Liege from February to April, and when it bears fruit, they need exactly a day and a year to ripen. If the plants do not bear fruit they flower again the next year, but if they bear fruit they require some years rest before they blossom again. But the reason of the vanilla not producing fruit in Europe when it has flowered arises from the structure of the flower itself. 'The flower,' says Morren, 'has this peculiarity, that the retinaculum is highly developed, so that this organ forms a curtain suspended before and above the stigmatic surface, thus separating it completely from the anther, which in its turn encloses in two cavities, naturally short, the pulverulent masses of pollen. From this structure it results that all approximation of the sexes in orchideous plants is naturally impossible. It is thus necessary either to raise the velamen or to cut it, when the plant is to be fecundated, and to place in direct contact the pollen and the stigmatic surface. The indation never fails, and we may be convinced of its ges by observing the flower some hours after the open. If impregnation has been effected, the sepals and ls reverse inwardly, and the flower droops instead of aining erect. So soon as the following day the ovarium gates.' The process here pointed out is a beautiful il-ration of the application of physiological principles to cultivation of plants. This process, which in these cli-es is obliged to be performed artificially, is done na-lly, by insects, in countries where the plants grow. ough Professor Morren published his paper on this sub-in 1839, it does not appear that either in this country n the Continent that his method has been successful e hands of others. We saw Professor Morren's plants iege in the summer of 1839, on which there was then undant crop of fine fruit. Vanilla is not an article of h consumption in Great Britain. There is a duty of r lb. on its importation; and this is paid on all the This would be a heavy duty on an article of which quantity can be consumed; but it is quite the con-ith vanilla, as only a small portion needs to be em-. It is not then probably the heavy duty so much ant of taste for it that prevents its consumption in country. From its chemical composition there can ttle doubt that for persons labouring under the phatic diathesis it might become a useful article of (*Provincial Medical Journal*, 1843.)

ctionnaire des Sciences Naturelles; Morren, *On the ction of Vanilla in Europe*, in *Ann. of Nat. Hist.*, vol. Lindley, *Genera and Species of Orchidaceous Plants*.)

ANILLA'CEÆ, a natural order of plants belonging to y's Gynandrous group of Endogens. This order was constructed by Lindley in his 'Key to Structural, ological, and Systematic Botany.' The following are

Vanilla aromatica.

Branch with flowers; 2, branch with fruit; 3, section of fruit showing ee placentæ and indefinite seeds.

ssential characters: perianth articulated with the , sometimes with an external calycine cup; sepals 3; ls 3, of which one is unlike the others and forms a stamen 1, consolidated with the style into a column; anther terminal, opercular; pollen granular; ovary 1-celled with 3 parietal placentæ; fruit succulent, indehiscent, 1-celled; seeds either with a smooth testa tightly adhering to them or with a thin membranous wing surrounding a firm nucleus. (Lindley, *Nat. Syst.*, p. 341.) The species are herbaceous plants with broad sessile and often strongly veined leaves. The stem of these plants is mostly climbing and the flowers are large and succulent. The genera Epistephium and Vanilla are generally referred to the natural order Orchidaceæ. The reason that induced Dr. Lindley to separate these genera from the rest of the order was, 'because of their succulent valveless fruit, of their seeds not having the loose testa which exists in all true Orchidaceæ, and of their peculiar habit, to which may be added their aromatic properties.'

Since the publication of the 'Natural System,' Professor Lindley has published his 'Genera and Species of Orchidaceous Plants,' in which he has referred Vanillaceæ back again to Orchidaceæ, under the suborder Arethuseæ, of which it forms the section Vanilleæ. In this section a new genus, *Erythrorchis*, is described, which has stems from 50 to 120 feet long, of a pale dull red colour, and climbing to the tops of lofty trees. The flowers are of a middle size and of a whitish-yellow colour. For the principal properties of this order see VANILLA.

VANI'NI, LUCI'LIO, born at Taurosano, in the province of Otranto, in 1585, studied at Naples, Rome, and Padua, and applied himself especially to metaphysics. He afterwards travelled about Germany, France, and England. He was of a sceptical turn of mind, but seems to have had a leaning towards astrology. Cardano and Pomponazzi were his favourite authors. He was fond of religious polemics, a perilous vocation in that age. He says himself that he held disputations in England in favour of the Roman Catholic faith, and was imprisoned forty-nine days for it. Returning to Italy, he taught philosophy at Genoa; but perceiving that his orthodoxy was suspected, he went to France, where he published a curious work, the title of which alone gives some insight into the state of his mind—'Amphitheatrum æternæ Providentiæ Divino-magicum, Christiano-physicum, nec non Astrologo-catholicum, adversus veteres Philosophos, Atheos, Epicureos, Peripateticos, et Stoicos,' Lyon, 1615. His next work was 'De admirandis Naturæ, Reginæ Deæque mortalium, Arcanis,' Paris, 1616. This work raised a storm against the author, because it was considered as savouring of pantheism. The Sorbonne condemned the book to the flames. In the mean time Vanini was offering his services to the Papal nuncio Ubaldini at Paris, to write a defence of the Council of Trent. In 1617 he left Paris for Toulouse, where, some time after, he was arrested by order of the parliament of that city; and in February, 1619, he was condemned to be burnt as a professed atheist. The president of the parliament, De Grammont, wrote an account of his condemnation and execution, which is given by Brucker, in his 'History of Philosophy,' and by Niceron, in his 'Mémoires des Hommes Illustres,' from which it appears that Vanini died making a profession of atheism. But several Roman Catholic writers, among others Tommaso Barbieri, in his 'Notizie dei Matematici e Filosofi Napolitani,' have defended Vanini against the charge of atheism.

(Tiraboschi, *Storia della Letteratura Italiana*.)

VANISH (Mathematics). A quantity is said to vanish, or to become evanescent, when its arithmetical value is nothing, or denoted by 0. When the evanescent quantity is only a part of another, there is seldom or never any more difficulty about the case in which it vanishes than about that in which it takes any other specified value: but when the whole of what is under consideration vanishes, any or all of those views may be required to render this case intelligible which are explained in NOTHING; INFINITE; LIMITS; RATIOS, PRIME AND ULTIMATE; &c. And in particular the phrase of two quantities vanishing in a certain ratio is to be referred to the last of the articles cited.

VANISHING FRACTIONS. [FRACTIONS, VANISHING.]

VANISHING POINT, LINE, &c. [PERSPECTIVE.]

VANLOO, CHARLES ANDRE', knight of the Order of St. Michael and director of the French Academy of Painting at Paris, the son of Louis, the younger brother of Jean Baptiste Vanloo, was born at Nice in 1705. He learned painting and sculpture when a boy at Rome; he was instructed in painting by his brother and by Benedetto Luti, and in sculpture by Le Gros. His brother took him with him to Paris in 1719, and he commenced his career as a decorative painter in the great Opera-house, but he soon forsook this branch for portrait painting. In 1723, when only eighteen, he gained the first medal for drawing at the Academy, and in 1724 the first prize for painting. In 1727 he went again to Rome, and gained one of the prizes of the Academy of St. Luke: he also distinguished himself by a picture of the Apotheosis of St. Isidore, and two or three other works, which attracted the notice of the Cardinal de Polignac, then French minister at the court of Rome, who procured him a pension from the French king; and in 1729 he was honoured with the title of Cavaliere by the pope.

On his return to Paris he delayed some time at Turin, where he painted eleven pictures from Tasso's 'Jerusalem Delivered,' for the king of Sardinia; and he married there the celebrated singer Christine Sommis, with whom he arrived at Paris in 1734. Dandre Bardon, who wrote a Life of Charles Vanloo, says that Madam Vanloo was the first singer who excited the admiration of the French for Italian music. In 1735 Vanloo was admitted a member of the Academy; he painted as his reception picture Marsyas flayed by Apollo, which is one of his best works. Frederic the Great of Prussia wished him to enter into his service, and offered him a pension of 3000 dollars (450*l*.) and distinct payment for his works; Vanloo however declined, but recommended his nephew Charles Amadée Philippe to Frederic, who was appointed the king's painter. Vanloo himself painted for the king a picture of the Sacrifice of Iphigenia.

In 1751 Vanloo was presented by Louis XV. with the Order of St. Michael; and in the same year was made director of the Academy: in 1762 he was appointed principal painter to the king. He died in Paris in 1765.

Charles André Vanloo was considered by the admirers of the old French school the last of the great historical painters of France. He was an easy and a rapid draughtsman; was true and vigorous in colouring, and had a masterly execution; he was however rather poor in invention. He was very fastidious, and he often destroyed some of his best pieces. He was a man of singular temper; he went every night to the theatres, but generally to the Italian comedy, yet he always rose early. Diderot (*Essai sur la Peinture*) says that Vanloo could neither read nor write.

VANLOO, JEAN BAPTISTE, originally of a noble family of Ecluse in Flanders, which had long numbered painters among its members, was born at Aix in Provence, in 1684. His grandfather Jacques was a clever portrait painter, and his father Louis Vanloo excelled in design and was a good fresco painter: he was educated in Paris in the French Academy, but settled at Aix in Provence in 1683. His two sons, Jean Baptiste and Charles André, both became eminent painters.

Jean Baptiste was instructed by his father, who taught him to draw when he was still a child: he set him to copy pictures by the old masters, and young Vanloo is said to have made a good copy when he was only eight years of age. Jean Baptiste painted portraits and history, and first practised at Nice and Toulon, where he married the daughter of an advocate. He was obliged to leave Toulon in 1707, when it was besieged by Victor, duke of Savoy, afterwards called king of Sardinia, and he returned to Aix, where he remained five years, during which time he painted many portraits and several religious pieces. In 1712 he returned to Nice, and his father dying shortly afterwards, he finished the works which his father had left incomplete. He then went to Genoa and to Turin, where he was noticed by the duke of Savoy, whose family he painted, as well as a portrait of the duke himself. He became acquainted at Turin also with the duke's son-in-law the Prince of Carignano, who took Vanloo into his service and sent him to Rome, where he became the scholar of Benedetto Luti. In 1719 Vanloo was lodged by his patron the Prince of Carignano in his hotel at Paris. On his return from Rome, Vanloo visited Turin and painted some pictures for the king of Sardinia, who would have retained him in his service but for his engagement with the Prince of Carignano. He soon acquired a great reputation in Paris, and was in great favour with the regent, the duke of Orleans, for whom he repaired in distemper the five cartoons by Julio Romano of the Loves of Jupiter, and the frescoes of Niccolo Abati from the designs of Primaticcio at Fontainebleau. In the latter he was assisted by his brother Charles André. These works and the gallery containing them were destroyed in 1738 to make room for a new building.

In portrait Vanloo had few rivals in Paris. He painted Louis XV. and the queen of France; also the king Stanislaus Leczinski and his queen. Yet although he was so much occupied with portraits, he applied himself constantly to historical pieces, some of which gained him great credit. In 1731 he was made a member of the Academy, and in 1735 he was appointed professor. He painted a picture of Diana and Endymion for his reception into the Academy. Notwithstanding Vanloo's great success, a large family and an unsuccessful speculation (he lost 40,000 francs in the Mississippi scheme) rendered constant exertion necessary. He came, in 1738, with two of his sons to London, with a view of trying his fortune in this country, and he met with great success. His first works in London were portraits of Colley Cibber and Owen Mac Swinney, 'whose long silver-grey hairs,' says Walpole, 'were extremely picturesque, and contributed to give the new painter reputation.' He continues—'Vanloo soon bore away the chief business of London from every other painter. His likenesses were very strong, but not favourable, and his heads coloured with force. He executed very little of the rest of his pictures, the draperies of which were supplied by Van Aken and Vanloo's own disciples Eccardt and Root. However Vanloo certainly introduced a better style; his pictures were thoroughly finished, natural, and no part neglected. He was laborious and demanded five sittings from each person. But he soon left the palm to be again contended for by his rivals. He laboured under a complication of distempers, and being advised to try the air of his own country, Provence, he retired thither in October, 1742, and died there in April 1746.' He left about 90.000 francs to his family.

Vanloo had an extraordinary facility of execution: he painted three well-finished heads in a single day. His colouring was rich and his drawing was correct. He had five sons, two of whom became distinguished painters, Louis Michel, painter to Philip V., king of Spain, and Charles Amadée Philippe, painter to Frederic the Great of Prussia.

Vanloo's historical pieces are numerous: Christ entering into Jerusalem, at St. Martin des Champs; and St. Peter delivered from Prison, at St. Germain des Prés, at Paris, are among his best works.

(D'Argenville, *Abrégé de la Vie des plus fameux Peintres*, &c., Supp.; Walpole, *Anecdotes of Painting*, &c.; Abbé de Fontenai, *Dictionnaire des Artistes*, &c.; Fiorillo, *Geschichte der Mahlerey*, vol. iii.)

VANMANDER, CAREL, or CHARLES, a painter, poet, and biographer, born at Meulebeke near Courtray in 1548, was descended of an old noble family of West Flanders: members of his family had held high offices in church and state as early as the thirteenth century. His father was a landowner and farmed likewise some government estates. Vanmander showed great ability for both poetry and painting when very young, and he was placed at an early age with Lucas de Heere at Ghent, likewise a poet and painter. He studied painting afterwards with Peter Vlerick at Courtray; and in 1569 he returned home. He spent five years in his native place, devoting much of his time to poetry and dramatic representations, and he superintended a theatre at home, of which he was poet, painter, and manager, and which he made extremely popular. He painted also some altar-pieces and a few other pictures. In 1574 he set out for Rome. In Rome Vanmander became acquainted with Spranger, and was led away from the correct taste which he might otherwise have acquired there by the mannerism of that master and of the period. He was however very industrious, and acquired great distinction. He left Rome in 1577 for his own country, and on his way visited Basel and Vienna. At Basel he painted some frescoes in the cemetery: at Vienna he again met with Spranger, and assisted him in some of his works. Vanmander, after his return home, lived some years in peace, dividing his time between poetry and painting; but the civil wars soon rendered it necessary for him ve his native place. His father's house was plundered some Walloons, and he himself only escaped hanging the accidental arrival on the spot of an Italian with whom had been acquainted in Rome, who released him. He st went to Courtray, but upon the plague breaking out that place he removed to Bruges; and shortly afterards, in 1583, he went with his wife and two children to aarlem, where he remained twenty years, respected by all ho knew him. At Haarlem Vanmander established an ademy, and had many scholars; here also he accomlished many literary labours. He wrote many songs: anslated the 'Iliad;' the 'Bucolics' and 'Georgics' of irgil; and Ovid's 'Metamorphoses;' and compiled also he greater part of his 'Lives of the Painters,' which he nished, in 1604, at Sevenbergen, a castle between Alkaar and Haarlem. In the same year he removed to msterdam, where he died in 1606, aged 58, leaving a ife and seven children to deplore his loss. Three hunred of his friends and scholars followed his body to its rave.

The world is chiefly indebted to Vanmander for his Lives of the Painters' ('Het Schilder Boek'), Haarlem, 1604, to., which contains notices of the painters of antiquity, and f the most celebrated Italian, German, Dutch, and Flemsh painters. A modernized edition of the Dutch, Flemish, nd German painters, with many portraits, and some addiions, was published at Amsterdam in 1764, under the title Het Leven der Doorluchtige Nederlandsche en eenige Ioogduitsche Schilders' ('Lives of the Illustrious Netherand and some German Painters'). Vanmander painted a onsiderable number of pictures on religious subjects, many f which have been engraved. He was a good landscape ainter, both in fresco and in oil: he executed at Rome ome large landscapes in fresco which gained him great redit. His son, Charles Vanmander, born at Delft in 1580, lso distinguished himself as an historical and portrait ainter. He was painter to Christian IV., king of Denmark, excelled in portrait painting, had a free touch, and oloured well. He was still living in 1665.

(Vanmander, *Het Leven der Schilders*, ed. 1764; Schopenhauer, *Johann Van Eyck und seine Nachfolger*; Fiorillo, *Geschichte der Zeichnenden Künste*, &c.; Füssli, *Allgemeines Künstler Lexicon*.)

VANNES, a town in the west of France, capital of the lepartment of Morbihan, 242 miles in a direct line westouth-west of Paris, or 277 miles by the road through Versailles, Dreux, Alençon, Mayenne, Laval, Rennes, and Ploermel: in 47° 38′ N. lat. and 2° 46′ W. long.

Vannes is commonly identified by geographers with the Dariorigum (Δαριόριγον) of Ptolemy, the capital of the Veneti. But as Cæsar has particularly described the situation of the towns of the Veneti, on tongues of land nsulated at high-water (*De Bell. Gall.*, iii. 12), it has been suggested by the historians of Bretagne (Lobineau and Morice) that the site of Dariorigum could not be identical with that of the modern Vannes; and D'Anville, who adopts the suggestion, is inclined to place Dariorigum on a tongue of land, such as described by Cæsar, on the shore of the bay of Morbihan, about three miles from Vannes, called still Durouec. At what period the townsmen transferred their residence to the site of the modern town is not known: possibly it was on the conquest of the Veneti by Cæsar, or when, by the firm establishment of the Roman dominion, security from attack was less needed than convenience. Malte-Brun supposes the site of Dariorigum and Vannes to be the same, and that the sea formerly flowed up to it. In the later period of the Roman dominion Dariorigum seems to have assumed the name of Veneti, from which the modern Vannes has been derived. The Breton name of the town is still Wenet or Guenet. In the middle ages Vannes was the capital of a county held by the dukes of Bretagne. It was repeatedly taken and retaken in the war of Charles de Blois and Jean de Montfort for the succession of Bretagne. [Bretagne.]

Vannes is situated at the confluence of two small streams which fall into the northernmost recess of the bay of Morbihan, two or three miles below the town. The town itself appears to be on the point of land formed by the junction of the rivers, and is surrounded by walls, which are in good preservation; it has two faubourgs or suburbs, larger than the town itself, from which one of them is separated by the town wall, which is here strengthened by towers and a ditch. On the north side of the town are barren heaths, and on the south side extensive marshes; yet the vicinity affords some agreeable walks and picturesque objects. The streets are dark; the houses are chiefly of stone, and, except some on the quay, are gloomy and old. The cathedral is a Gothic building, which Malte-Brun characterises as heavy; but Mrs. Stothard speaks of its 'high and tapering spires.' The other Gothic buildings were for the most part destroyed at the Revolution: the ruins of some of them remain.

The population of the commune, in 1826, was 11,289; in 1831, 10,395; and in 1836, 11,623. The town is commercial rather than manufacturing, though coarse woollens, lace, cotton-yarn, calico and other cotton goods, and hats are manufactured. The port, formed by the river, is narrow and inconvenient; it is lined by quays faced with freestone. The pilchard fishery is carried on to a considerable extent, and the small vessels to which the port is accessible import wines from Bordeaux, brandy, oil, soap, and colonial produce; and export corn and salt. Trade is carried on in hemp, honey, wax, butter, cider, and iron-wares. Ships are built. There are several cattle and horse fairs in the year, at which considerable business is done. Vannes has a subordinate court of justice and a commercial court; a number of fiscal and administrative government offices, a high school for the commune, with a collection of philosophical apparatus; a free school for navigation, a public library, a polymathic society for promoting the cultivation of science, literature, and art, which has commenced the formation of a museum, chiefly of natural history; an hospital, a theatre, and three public walks.

The bishopric of Vannes dates from the fifth century: the diocese includes the department, and the bishop is a suffragan of the archbishop of Tours.

The arrondissement of Vannes has an area of 633 square miles, and comprehends 74 communes: it is divided into 11 cantons or districts, each under a justice of the peace: the population, in 1831, was 119,774; in 1836, 125,898.

(Malte-Brun, *Géographie*; Ogée, *Dictionnaire de Bretagne*; Mrs. C. Stothard, *Letters written during a Tour in Normandy, Britanny, &c.*; D'Anville, *Notice de l'Ancienne Gaule*; *Dictionnaire Géographique Universel*.)

VANNI, CAVALIERE FRANCESCO, one of the most celebrated Italian painters of the latter half of the sixteenth century, was born at Siena, in 1565, of a family long distinguished in the Sienese annals of painting. He was first instructed by his father, and after his death, for a short time, by his step-father Archangelo Salimbeni: he is then said to have studied with Bartolomeo Passarotti at Bologna, which Lanzi questions; and in his sixteenth year he went to Rome and finished his studies with Giovanni de' Vecchi. He ultimately adopted the style of Baroccio, and became the most distinguished of all that painter's imitators; though he copied also some of the works of Correggio and Parmegiano at Parma, and it was perhaps more owing to his admiration for the works and style of Correggio that he painted in the manner of Baroccio, than from any direct imitation of the latter. Vanni obtained such reputation at Siena by some of the altar-pieces which he executed for its churches, that he was invited by Clement VIII. to Rome, and commissioned by that pontiff to paint a picture for one of the altars of St. Peter's. He painted Simon Magus rebuked by Peter, and gave such satisfaction that he was created cavaliere of the order of Christ. This picture is still in good preservation, is executed completely in the style of Baroccio, and is one of Vanni's best works. Other celebrated works by him in Rome are—in Santa Cecilia in Trastevere, the Flagellation of Christ, and the Death of St. Cecilia; and a Dead Christ in Santa Maria della Vallicella. He painted also some celebrated works in Siena, at Pisa, and at Pistoia. His picture of St. Raimond walking on the Sea, at San Domenico, is considered the best painting at Siena. He was also a skilful architect. He died at Siena in 1609, aged only 44, according to Baldinucci, or 46, according to D'Argenville, who gives 1563 as the date of his birth.

Vanni's style was so much like that of Baroccio, that even good judges have been misled as to the authorship of some of Vanni's pictures, supposing them to be works of Baroccio. With however the single exception of colouring, Vanni was upon the whole inferior to Baroccio; and in colouring he was sometimes hard. His drawing in geneial was excellent, but has less fulness than Baroccio's; he had also less vigour of conception and less spirit of execution.

Vanni formed a numerous school, of which his two sons Michelangelo and Raphael Vanni were distinguished scholars. Both attained the rank of cavaliere, but, says Lanzi, the younger was the more deserving of it. Raphael was born in 1596. He painted many pictures of merit in Rome; where, in 1655, he was elected a member of the Academy of St. Luke. He painted in the style of Pietro da Cortona.

Many of the works of Francesco Vanni have been engraved by some of the most eminent engravers; he himself also etched a few plates. His portrait is in the painter's portrait gallery at Florence.

VANNI, GIOVANNI BATTISTA, a Florentine painter, or, according to others, a native of Pisa, was born in 1599. He was the scholar, first, of Jacopo da Empoli, and then of Christofano Allori, in whose style he painted, especially in colouring. He excelled in imitating, and made some excellent copies after Titian, Correggio, and Paul Veronese; he etched some plates after the two last, in a spirited though careless manner: the Marriage at Cana, after Paul Veronese, dated 1637, is his best production in this line. The painting of San Lorenzo, in the church of San Simone at Florence, is considered his best picture; but it is not a work of the highest order. He died in 1660.

(Baldinucci, *Notizie de' Professori del disegno da Cimabue in quà*; Lanzi, *Storia Pittorica*, &c.; D'Argenville, *Abrégé*, &c.; Huber, *Manuel des Amateurs*, &c.)

VAN OOST, JACOB, the Elder, a celebrated Flemish historical painter, was born at Bruges, in 1600, of a good family. He distinguished himself when very young, and even before his 21st year was accounted one of the best painters of Bruges. He copied some of the pictures of Rubens with such fidelity, both of colouring and execution, that his copies have passed, and still pass, for originals by that master. After painting some time at Bruges, he went to Italy, and paid great attention to the works of Annibal Carracci at Rome, and endeavoured to appropriate his style of composition and design, which he did to a great degree. He returned in 1630 to Bruges with the reputation of a great painter, and was solicited for works from all quarters. In 1633 he was elected dean of the corporation of painters of Bruges. His pictures are very numerous, though on a large scale: his design and chiaroscuro were good, and his colouring rich and fresh in the carnations; but his draperies are sometimes raw and careless. Some of his pictures are executed with such boldness, that they are scarcely intelligible except at a considerable distance, when their effect is masterly; others, on the contrary, are highly finished, and the colours are well blended. His pictures have few figures, are well composed, and are unencumbered with unnecessary accessories: the landscape of his backgrounds was painted by other masters; the architecture, in which he excelled, by himself. There are many of his works at Bruges: in the Hôpital de St. Jean there are several, some of which are among his best pieces. In one of the halls of justice at Bruges there is a picture of the condemnation of a criminal, which is considered Van Oost's masterpiece. He was equally excellent as a portrait painter. He died in 1691.

VAN OOST, JACOB, the Younger, son of the elder Van Oost, was born at Bruges in 1637. He was first instructed by his father, then studied two years in Paris, and afterwards spent some time in Rome. After his return to Bruges he for a short time assisted his father; but having determined to establish himself at Paris, he set out for that capital in 1673. He however delayed upon his road at Lille to paint a few portraits, which brought him so many sitters and other engagements, that he fixed himself in that place, and remained there forty years, until after the death of his wife. He returned to his native place in 1713, the year of his death, and the seventy-sixth of his age. The younger Van Oost was also an able painter in history and in portrait, but his historical pieces are not numerous. His style was like that of his father, but he painted with a better impasto, and his draperies are very superior. His figures are correct and expressive.

(Descamps, *La Vie des Peintres Flamands*, &c.; Watelet et Levesque, *Dictionnaire des Arts de Peinture*, &c.; *Notice des Tableaux qui composent Le Musée de L'Hôpital Civil de S. Jean à Bruges.*)

VAN OS, PIETER GERARD. This distinguished animal-painter was the son of Jan Van Os, a clever flower-painter, who was born in 1774. and died at the Hague in 1808. He was also a marine painter and a poet.

Pieter Van Os was born at the Hague in 1776, and was taught painting by his father. He selected Paul Potter as his model, and copied his pictures assiduously, and some of the works of Charles Dujardin. He made such an excellent copy of the celebrated young bull by Potter, in the gallery of the Hague, that William V., prince of Orange, purchased it and a copy after Dujardin, and placed them in his gallery. For a time, owing to the disturbed state of society towards the end of the eighteenth century, which was very unfavourable to the arts, Van Os was forced to give up his favourite pursuit of animal painting, and to take to portrait painting in miniature and to teaching drawing. After a few years however he again commenced painting landscapes, with cattle, sheep, &c., by which he acquired a great reputation. In 1813 and 1814 he served as a captain of volunteers, and was present in some engagements, which induced him to try his hand at military subjects, in which he was not unsuccessful. The emperor Alexander purchased a picture of him in 1812, of the entrance of the Cossacks into Utrecht, and placed it in his palace at St. Petersburg. He died in the Hague in 1839.

The pictures of Van Os are numerous, and are sold at high prices: many of them have been engraved. He himself also etched many plates of cattle, &c. in a masterly manner from his own designs, and from the pictures of eminent painters, Potter, Berghem, Ruisdael, and others.

(Dr. Nagler, *Neues Allgemeines Künstler Lexicon*.

VANSLEB. [Wansleben.]

VANSOMER, PAUL, a Flemish portrait painter, born at Antwerp about 1576. He was instructed by his brother Bernard Vansomer, a good painter of conversation pieces and portraits, who had studied in Italy, and lived at Amsterdam. Paul came to England about the year 1606, and met with great success here. He painted James I., and many of the principal statesmen and noblemen of that time. There is a portrait of James I. at Windsor, a view of Whitehall in the background; and another at Hampton Court, with some armour by his side, painted in 1615, a superior picture, according to Walpole. There is also at Hampton Court a portrait of the queen of James I. with a horse and dogs, by Vansomer; which is imitated, says Walpole, in the tapestry at Houghton. The same writer mentions likewise the following pictures by this painter:—Lord Chancellor Bacon, and his brother Nicholas, at Gorhambury (there is a portrait of Bacon by Vansomer, in the collection of Earl Cowper at Pansanger); the Marquis of Hamilton with a white staff, at Hampton Court; the lord chamberlain, William, earl of Pembroke, at St. James's, an admirable portrait; and in Walpole's opinion, a whole length at Chatsworth of the first earl of Devonshire in his robes, though ascribed to Mytens, worthy of the pencil of Vandyck, and one of the finest single figures he had ever seen. He mentions also a portrait of Anne of Denmark, the queen of James I., with a prospect of the west end of St. Paul's.

Vansomer died in London, and was buried in St. Martin's in the Fields, as appears by the register: 'Jan. 5, 1621. Paulus Vansomer, pictor eximius, sepultus fuit in ecclesiâ.' (Walpole, *Anecdotes of Painting in England.*)

VAN SWIETEN. [Swieten.]

VANUCCHI. [Sarto.]

VANUDEN, LUCAS, a distinguished Flemish landscape painter, born at Antwerp in 1595. He was instructed by his father, who was also a landscape painter: but not satisfied with the precepts of art, he was constantly in the fields, from sunrise until sunset, sketching all the striking effects of nature, and he made valuable use of his studies in his paintings. Rubens was a great admirer of the works of Vanuden; he employed him to paint skies and landscapes in many of his pictures, which Vanuden adapted admirably to the style of Rubens. Rubens also inserted figures in the pictures of Vanuden, although he himself was a good figure-painter.

His paintings are distinguished for their lightness of touch, clearness and truth of colouring, and for pure skies and light easy foliage. He painted large and small pictures, adapting his touch to the size and nature of his

position, but his small pieces are more characteristic
is style: he was fond of extensive and distant scenes.
uden also etched some landscapes in a masterly
ner, some original designs, and some after Rubens
Titian. The date of his death is not known, but he
after 1662. (Descamps, *La Vie des Peintres Flamands*,
; Huber, *Manuel des Amateurs*, &c.)

AN UTRECHT, ADRIAN, born at Antwerp in 1599,
one of the most distinguished of the Flemish painters
till-life. He painted fruit, flowers, shell-fish, dead
ie, birds, &c., sometimes together and sometimes sepa-
ly, with such remarkable truth and freedom of touch,
elegance of composition, that he received many more
rs than he could execute. The best of his pictures
e purchased by the king of Spain, and taken to that
ntry: they are very scarce, are rarely met with at
ions, and are sold for high prices. He excelled in
s of all descriptions. He died rich, at Antwerp, in
1. With the exception of Snyders, Van Utrecht was
erior to all other painters in his line. (Houbraken,
ote Schouburgh, &c.; Descamps, *La Vie des Peintres
mands*, &c.)

'AN VEEN, or VAENIUS, OTHO, called also Otto-
ius, a distinguished painter, born at Leyden in 1550,
ording to Houbraken, or 1556, according to De Piles
others; Van Mander says he was 47 in 1604. His
er was burgomaster of Leyden, and his mother was of
istinguished family of Amsterdam. Van Veen was
ucted in letters by Lampsonius, private secretary to
bishop of Liege, and was taught drawing by Isaac
s or Nicolas, and painting by Jost Van Wingen. His
er sent him to Liege in his fifteenth year, where he
ained three years in the house of the bishop, Cardinal
osbeek, who then sent him to Rome with letters to
dinal Maduccio, by whom he was well received. In
ne Van Veen studied with Federigo Zucchero; and
r spending eight years in Italy, he visited Vienna, where
emperor wished to detain him in his service: he visited
Munich and Cologne, where he likewise had flatter-
offers to induce him to remain, but which his desire
settle in his own country compelled him to decline.
settled at Brussels, in the service of Alessandro Farnese,
e of Parma, and governor of the Spanish Netherlands,
whom he painted a full length in armour, which ob-
ed him a great reputation. After the death of the
e of Parma, Van Veen removed to Antwerp, esta-
hed an academy there, and painted many pictures for
hurches. Rubens attended his academy. When the
hduke Albert of Austria, who succeeded the duke of
ma as governor, made his public entry into Antwerp,
Veen designed the triumphant arches which were
ted upon the occasion; and the duke was so well
fied with the devices, that he invited Van Veen to
sels, and appointed him master of the mint there. He
ted the portraits of Albert, and of his wife, the infanta
ella, daughter of Philip II. of Spain, which were sent
ames I. of England. Louis XIII. invited Van Veen
aris, but he declined to leave the archduke.

an Veen died at Brussels in 1634, aged 78, or, accord-
to Houbraken, in 1629. He left two daughters, Ger-
e and Cornelia, who both distinguished themselves in
ting; Gertrude painted her father's portrait, which
been engraved.

here are several paintings by Van Veen at Antwerp;
in the cathedral of Leyden there is a Supper of the
d, which is considered a good work; he excelled in
ention and in chiaroscuro. His imagination was very
ile: his designs are very numerous; a list of them, with
Life of Van Veen, was printed at Amsterdam in 1682,
work entitled 'Académie des Sciences et des Arts,' &c.,
Isaac Bullart. Among them are emblems of Horace:
nnebeelden getrokken uit Horatius Flaccus,' &c., 103
es, with text illustrations in Latin, Dutch, and French.
ny of the designs are ingenious in their invention, and
ful in their composition, but the plates are badly exe-
d. He designed also emblems of divine and profane
; and thirty-two illustrations of the life of Thomas
inas. He published also a history of the war of the
avians under Claudius Civilis against the Romans, from
itus, with forty illustrations; and the history of 'The
en Twin Sons of Lara,' likewise with forty illustrations,
ch were engraved by Antonio Tempesta. Felibien, in
'Entretiens sur les Vies des plus célèbres Peintres,' has extracted part of this work, relating the story and describing the subject of each plate. In the Pinakothek at Munich there are six small allegorical paintings of the triumph of the Roman church by Van Veen; curious designs, but extremely cold and blue in colouring. Van Veen was very fond of allegorical and emblematical representations, and Reynolds supposes that Rubens acquired his taste for the same subjects from him. In the cathedral at Bruges there is a Nativity by Van Veen, of which Reynolds observes:—'Many parts of this picture bring to mind the manner of Rubens, particularly the colouring of the arm of one of the shepherds; but in comparison of Rubens it is but a lame performance, and would not be worth mentioning here, but from its being the work of a man who had the honour to be the master of Rubens.'

VANVITELLI, LUIGI, a very distinguished architect, inasmuch as he erected one of the most extensive edifices of the eighteenth century, in which however it must be admitted the greatness of the opportunity was not equalled by his talent. Though he may be considered an Italian, Luigi was of Flemish origin, his father being a native of Utrecht, whose real name was Van Witel, afterwards Italianized by a slight alteration. Gasparo, the elder Vanvitelli, was born in Utrecht in 1647, and going to Italy for improvement in his profession as a painter, fixed his residence at Naples, where he acquired considerable repute for his ability in landscape and architectural subjects. He was familiarly known as *Vanvitelli degli Occhiali*, on account of his always wearing spectacles, without which he could hardly see; yet he continued to paint after he had reached a very advanced age, and indeed after he had submitted to an unsuccessful operation on one eye, the sight of which he entirely lost. He died in 1736, at the age of eighty-nine.

His son Luigi was born at Naples in 1700, and began while a child to display a strong inclination and considerable aptitude for art, in which he was encouraged and instructed by his father. So great was his proficiency, that at the age of twenty he was employed by Cardinal Acquaviva to paint some frescoes in the chapel of St. Cecilia; and he afterwards made some of the cartoons from celebrated pictures, preparatory to their being copied on a larger scale, in mosaic, for St. Peter's at Rome. About this period too he began to study architecture under Filippo Ivara, one of the most noted in his profession. His first architectural work was the restoration of the Palazzo Albani at Urbino, for the Cardinal di San Clemente; besides which he erected two churches in that city, S. Francesco and S. Domenico, works that led to his obtaining the appointment of architect to St. Peter's at the age of twenty-six. He was also associated with Niccolo Salvi in the undertaking for conducting the water of the Vermicino to Rome. About the same time there was a competition of all the most eminent architects of the day for a façade for the church of S. Giovanni Laterano at Rome, to which both Salvi and Vanvitelli sent in designs; and, according to a memoir on the subject by the latter, their designs were approved: but the first decision was set aside by the pope, who determined in favour of that by Galilei; yet not so much, it is said, on account of its architectural merit as for private reasons. However, neither Salvi nor Vanvitelli was overlooked: the former was employed upon the fountain of Trevi; the other sent to improve the harbour and public works at Ancona, where he built the celebrated lazaretto, a pentagonal structure, and repaired and altered some churches and chapels. He was likewise occupied with many employments of a similar nature at Macerata, Perugia, Pesaro, and Siena. When at Milan, in 1745, he made a design for the façade of the Duomo, in which he endeavoured to keep something of the character, if not of the style, of the rest of the edifice; but it was neither carried into execution at the time, nor afterwards followed in the actual façade begun by Leopoldo Pollak and completed by Zanoja and Amati. At Rome his most important work was the convent of S. Agostino; but he also executed there, for the Portuguese ambassador, a most superb chapel, which was conveyed to Portugal, and there re-erected in the church of the Jesuits at Lisbon.

Such was the reputation he had now obtained, that when the king of Naples, afterwards Charles III. of Spain, determined to erect a palace at Caserta that should be upon a scale hardly inferior to that of any other edifice of the kind in Europe, he at once made choice of Vanvitelli as the architect, and the first stone was laid, Jan. 28th, 1752.

This vast pile is an unbroken parallelogram of uniform design, all its fronts being nearly similar in their elevations: those facing the north and south are 730 feet, the others 570 in length, and the general height of the building is 102 feet, which is however increased to 162 at the angles, where there is a square pavilion, forming a second order. The elevations consist of a very lofty basement, comprising a ground-floor and mezzanine; and above that an Ionic order with two series of windows, and mezzanine windows in the frieze. Although it may be considered in some respect as the principal front, since it faces a spacious semi-elliptical piazza enclosed by a uniform range of buildings for lodgings and stables, the south front is less decorated than that towards the gardens, for it has columns only in the centre and at the extremities, while in the other the order is continued throughout in pilasters as well as columns; yet the degree of unity thus kept up is attended with a very great drawback, for the narrower intercolumns between the centre and end breaks cause the others to appear offensively wide, and those parts of the composition where there ought to have been greater richness to look poor and straggling: this is particularly the case with regard to the centre, which is only three intercolumns in width; therefore that and its pediment become insignificant in comparison with the entire mass, a defect which is further increased by the end pavilions being so much loftier. Owing to the great height of the basement, the cornice of the order (which is very plain and poor in itself) forms no adequate finish to the general elevation; and even if the entablature be considered only in relation to the order, independently of the basement, it is disfigured by the small mezzanine windows in its frieze. Internally the general plan is divided into four spacious courts by other ranges of building from north to south and from east to west, at whose intersection there is a large and lofty octagon crowned by a dome; but though this last shows itself as an important feature when seen in geometrical elevation, where it breaks the outline, and gives a towering central mass, it is entirely lost in the building, except in a very distant view of it, and can be seen only from the inner courts, a circumstance the less to be regretted, because it is very ugly. That part of the building forms a large octangular vestibule, with the grand staircase on one side and the chapel on the other; and these and the upper vestibule are by far the most striking and scenic portions of the interior, the rest only presenting long enfilades of rooms, with little remarkable in point of architecture. With the greatness of mere quantity, Caserta is deficient in grandeur of quality: except those pointed out, its faults are few; but its beauties also are few: therefore, considering what ample scope was afforded the architect, he must be considered to have failed—at least comparatively. Vanvitelli published a large folio volume of the plans, &c. in 1757, under the title of 'Dichiarazione de' Disegni del Reale Palazzo di Caserta.'

Besides the palace itself and the subordinate buildings attached to it, he executed at Caserta one of the most stupendous works of its kind ever undertaken in modern times, namely, the aqueduct, or ranges of aqueducts, commenced in 1753, in order to supply the palace with water. His labours at Caserta led to his being employed on many other works at Naples, the principal of which are the cavalry-barracks, near the Ponte Maddelena, and the three churches of S. Marcellino, Della Rotonda, and La Nunziata. Among those at other places are the public hall at Brescia and the bridge at Benevento. Few architects have enjoyed a more prosperous career; yet, shortly before his death, which happened March 1st, 1773, he had the mortification to incur a severe stigma upon his professional character, being condemned at Rome to pay the sum of 5000 crowns for having estimated the repairs of the aqueduct of Acqua Felice at only 2000, though the actual expense was 22,000 crowns.

(Milizia, *Vite*; Quatremère de Quincy, *Histoire, &c. des plus Célèbres Architectes*; *Kunstblatt*, 1824.)

VAPOUR. There are many substances, both fluid and solid, which when exposed to the air or to the more powerful agency of heat are gradually but totally dissipated, owing to their particles assuming the state of vapour by what is termed spontaneous evaporation. A vapour then consists of ponderable matter combined with sufficient specific heat to enable it to retain its aëriform existence: we have already [Gas] given a similar definition of a gas. The question then naturally arises, In what vapours differ from gases? The answer is, that the difference is a conventional one, being of degree only, and not of kind: thus when atmospheric air containing, as it always does, the vapour of water, is suddenly cooled by exposure to a colder substance, the water which it contained in the state of invisible vapour is deposited in the state of palpable water on the colder body; we say it is aqueous vapour or the vapour of water, and not aqueous gas. No similar change is produced, by this abstraction of heat, in the form of the constituents of the air, and they are therefore termed gaseous bodies or gases. The difference however, we repeat, is one of degree only, for many gaseous bodies [Gas] which had been, not many years since, considered as permanently elastic as atmospheric air, have been shown by the important investigations of Mr. Faraday to be reducible to liquids; and additional experiments have even shown that carbonic acid gas, which requires a pressure of 35 atmospheres to render it fluid, may by particular management be converted into a solid.

A practical difference between a vapour and a gas is illustrated by the use of the vapour of water, and its subsequent condensation, as a motive-power in the steam-engine. No known gaseous body could be employed with the same advantage, owing to the great degree of pressure and cold required for its condensation.

Evaporation, both spontaneous and artificial, and especially the latter, is employed in numerous manufacturing and chemical processes. When, for example, common salt is prepared from sea-water, it is exposed in the first instance to the air in shallow clay pits, by which spontaneous evaporation takes place; and this occurs to the greatest extent in hot weather, and when the surface of the brine is agitated by the wind. It is found however that spontaneous evaporation can be carried on with advantage to a certain extent only; and when this point is arrived at, the operation of salt-making is finished by removing the concentrated brine to iron vessels, in which the evaporation is artificially conducted by the application of heat, the vaporization being greater as the temperature is higher, till the boiling-point is arrived at, when it is greatest.

Evaporation is used for numerous purposes and processes, and in different modes, according to the substances operated on and the objects to be attained. When contrivances are adopted for condensing the whole or a portion of an evaporated liquid, the process is termed distillation, and the ends accomplished by it are various. When, for example, water is distilled, it is for the purpose of separating the saline and earthy impurities, which not being vaporizable, remain in the body of the still, while the pure vapour of the water is condensed by cooling in the worm: so again, when wine is submitted to distillation, it is for the purpose of evaporating and subsequently condensing the spirit or brandy from the water and the colouring-matter. When herbs, as lavender, peppermint, &c., are heated with water in a still, the oil and water rise in vapour and are condensed; when turpentine is similarly treated, a volatile oil rises in vapour, while the resin or rosin, not being volatile, remains in the still. Vaporization in the form of distillation is also largely employed in the preparation of various acids, such as the nitric acid, hydrochloric acid, &c.

When solid bodies are vaporized and subsequently condensed, the operation is termed *sublimation*, and it is resorted to with different intentions, as for the purification of camphor and the preparation of corrosive sublimate and calomel.

It will be evident on slight consideration that vessels of very different materials and construction must be employed in evaporation, distillation, and sublimation, and according to the nature of the substance operated on. Thus the first stage of the concentration of sulphuric acid is conducted in lead, the concluding one in glass or platinum; saline solutions are evaporated to the crystallizing point in lead or copper; the caustic alkalis in iron or silver; the distillation of spirits in copper, that of acids in iron, earthenware, or glass; while the preparation of common salt is completed on vessels of iron.

VAPOUR BATH. [Bath.]

VAR, a department of France, in the south-eastern rner of the kingdom. It is bounded on the north by the partment of Basses Alpes; on the north-east by the unty of Nice, now included in the kingdom of Sardinia, om which it is partly separated by the river Var, which ves name to the department; on the south-east and uth by the Mediterranean Sea; and on the west by the partment of Bouches du Rhône. Its form approximates a quadrangle. Its greatest length is from east-northast to west-south-west, from the junction of the rivers steron and Var to the border of the department of ouches du Rhône in a line between Brignolles and Mar-ille, 83 miles. This is the extreme length of the quad-angle; the extreme breadth is from Cape Sicié, near oulon, to the north-west corner of the department on the ank of the Durance, 49 miles. The department, in-luding its islands, lies between 42° 57′ and 43° 55′ N. at., and between 5° 41′ and 7° 15′ E. long. The area of he department is estimated at 2814 square miles, which is onsiderably above the average of the French departments, and is nearly equal to the conjoint areas of the three English counties of Gloucester, Worcester, and Hereford. The population, in 1826, was 311,095; in 1831, 317,501; nd in 1836, 323,404; showing an increase in the last eriod of five years of 5903, or less than two per cent., nd giving 115 inhabitants to a square mile. In amount nd density of population it is very far below the average f the departments of France; in amount it is inferior to he single county of Gloucester, the most populous, and in ensity to that of Hereford, the most thinly peopled of he three English counties with which we have compared .. Draguignan, the capital, is 412 miles in a straight line outh-south-east of Paris, or 552 miles by the road through ens, Auxerre, Lyon, Valence, Avignon, Aix, and Brig-olles; in 43° 31′ N. lat. and 6° 29′ E. long.

The coast of this department is rocky, and is skirted by umerous islands. From the mouth of the Var, at the astern extremity of the department, to Cape de la Garoupe, the coast forms an open bay, on the shore of which is the antient town of Antibes. Westward of Cape de la Garoupe are the somewhat deeper bays of Juan and Napoule, separated from each other by a small intervening headland, and protected seaward by the Lerins islands, comprehending the islands of Ste. Marguerite and St. Honorat, with some smaller ones. These islands are defended by a fort, and further protected by the surrounding ocks: they abound with rabbits and partridges. St. Honorat has its name from a monastery founded early in he fifth century by St. Honorat or Honoratus, bishop of Arles: Ste. Marguerite, which is nearest in-shore, acquired notoriety as one of the places of confinement of the pri-oner with the Iron Mask. Some other small gulfs, as the port of Agay, the gulf of Fréjus, the gulf of Grimaud, and the roadstead of Hyères, lie to the west of the gulf of Napoule. The roadstead of Hyères is bounded on the west by the peninsula of Giens, which is connected with the main-and by a low sandy isthmus, in the midst of which is the Étang or lagoon of Pesquier. Off the roadstead lie the Hyères islands, of which the chief are the Ile du Levant, or du Vent, or du Titan, the Ile de Portecros, and the Ile de Porquerolles. [HYERES.] West of the peninsula of Giens are the roadstead of Giens and the harbour of Toulon [TOULON], at the entrance of which are capes Carcaraine and Cepel or Sepet, and west of which are Cape Sicié and the Iles des Embiez. The coast is for the most part high, but some of the bays present a low sandy shore. There are several small seaports, but none of any importance except Toulon.

The department is mountainous. A branch of the Alps extends from east to west through the department, and separates the valley of the Argens and the tracts watered by the Siagne, Loup, and Var, all of which flow into the Mediterranean from the valley of the Durance, which belongs to the river-basin of the Rhône. Another range of mountains parallel to the above, and known as 'Les Monts des Maures,' extends along the coast between Hyères and Fréjus, separating the coast from the valley of the Argens, which river after draining the valley in its eastern course turns to the south-east and flows past the eastern extremity of 'Les Monts des Maures' into the Mediterranean near Fréjus. A group of mountains forming the continuation of 'Les Monts des Maures,' extending north-eastward from Fréjus, is known as Mont Esterel, and is distinguished by its picturesque character. The hill of Faron, immediately above Toulon, rises to the height of nearly 1400 feet; and Mont Caoume, near the same town, is 2606 feet above the level of the sea. The summit of the mountain La Sainte Baume, which is more inland, and close upon the boundary of this department and the department of Bouches du Rhône, is 3285 feet; and the mountain of Sainte Victoire, on the same boundary farther north, is 3125 feet. The coast eastward from Toulon is occupied by the primary and lower secondary formations, and presents in many parts a rugged and sterile soil: in the more inland parts these formations are covered by the limestones and other secondary rocks which intervene between the cretaceous and the carboniferous groups.

Among the minerals of the department are coal and lignite, but the coal-mines (of which there are only two) were not worked in 1834 or 1835. There were in 1834 seven lignite-mines, three of them at work, giving employment to 48 labourers, and producing in the year 1426 tons of lignite, worth on the average 10*s*. 4*d*. per ton. Marble of various colours, alabaster, porphyry, granite, serpentine, jasper, and gypsum are found; but we are not aware to what extent they are worked. There are salt-works on the coast, especially at Hyères.

The rivers are small, and none of them are navigable. The Gapou or Gapeau in the western part of the department, the Argens in the centre, and the Siagne and Loup in the eastern part, flow into the Mediterranean, and, with their several tributaries, belong wholly to this department. The Var, which belongs chiefly to the Sardinian territory, and its tributary the Esteron, form the eastern or north-eastern boundary of the department; and the Verdon, which flows into the Durance forms in one part the northern boundary. The Durance itself just touches the north-west corner. The length of the Argens, the most considerable river which belongs wholly to this department, may be estimated at about 60 miles: it receives the Caulon, the Calami, the united stream of the Bresque and the Braque, the Artuby, and the Endre. The Var is, perhaps, longer than the Argens, the Verdon and Durance certainly are; but they belong only partly to this department. There are no navigable canals. Three étangs or lagoons of considerable extent are found near the coast, and render the neighbourhood unwholesome: the chief is that of Pesquier, in the isthmus of Giens; the others are those of Napoule and Villepey, near the eastern extremity.

There were on Jan. 1, 1837, six Routes Royales, or government roads, in the department, having an aggregate length of 223 miles, of which 121 miles were in good repair, 61 miles out of repair, and 41 miles unfinished. The principal road is that from Paris by Aix into Italy, which traverses the department in its whole extent from west to east, passing through St. Maximin, Brignoles, Lorgues, Draguignan, Grasse, and Antibes, from whence it runs to Nice and Genoa. The road from Paris by Marseille to Toulon enters the department on the south-west side and passes by Ollioules to Toulon. These are both first-class roads. A road runs from Toulon by Sohés-le-Pont, Cuers, Pignans, Le Luc (where it falls in with a road from Brignoles), Fréjus, and Cannes, to Antibes; and another road, branching from this not far from Toulon, runs by Hyères and Bormes to St. Tropez. Another road from Paris into Italy by Grenoble, Gap, Sisteron, and Digne enters the department on the north side, and joins the principal road at Grasse. The departmental roads have an aggregate length of 362 miles, viz. 239 miles in repair, 117 miles out of repair, and 6 miles unfinished. The communal and other smaller roads may be estimated at about 1800 miles in length taken together.

The climate of the department is for the latitude temperate: the winters are mild except when 'the mistral' blows. The south-east wind is very relaxing, and indisposes to exertion.

The soil is by no means favourable, taken as a whole, however fertile particular spots may be; and from the hilly nature of the country, cultivation is very much carried on by manual labour. The area of the department may be estimated in round numbers at 1,800,000 acres; of which 300,000 acres, or less than a sixth part, are under the plough. The produce in grain is not equal to more than half the consumption of the department. The meadows do not amount to more than about 20,000 acres; but there is a considerable extent of about 450,000 acres of heath or other open pasture: in summer however the grass is so scorched up, that the sheep are chiefly sent at that season to feed in the mountain pastures of the department of Basses Alpes about Barcelonnette: about 300,000 sheep are thus sent yearly. Goats, whose milk is made into cheese, are numerous; as are mules, asses, and pigs. The vineyards are estimated at from 160,000 to 170,000 acres, and the orchards and gardens at about 5000 acres. The vine and the olive are cultivated in terraces on the slopes of the hills. The wines are generally red wines; those of La Gaude, St. Laurent, Cagnes, St. Paul, Villeneuve, and La Malgue are the best. The olives are used for making oil, or are exported for use at the table. The pomegranate, the citron, the orange, the almond, and the fig grow in the open air; the plum and the peach are grown and preserved for exportation: those of Brignolles are especially in repute; and the caper and the jujube are cultivated. The oranges of Hyères are reputed to be the best that are grown in France.

The woodlands constitute nearly a third part of the department: they are estimated at about 570,000 acres. They yield firs equal to those of the north of Europe, cork-trees, and the oaks on which are found the kermès used for dyeing scarlet. About 210,000 acres are devoted to culture of various kinds, including, we presume, the numerous olive-grounds, and the plantations of the mulberry-tree, the cultivation of which, as well as the rearing of silkworms, has much diminished during the present century. Odoriferous plants, the rose, jasmine, heliotrope, &c., are cultivated for making essences and perfumes, especially about Grasse. Game is abundant, and a great number of bees are kept, which produce exquisite honey.

The tunny, anchovy, and sardine fisheries are actively carried on along the coast; and the rivers yield abundance of fish, the sturgeon, trout, eel, shad, barbel, tench, carp, and cray-fish.

The department is divided into four arrondissements, as follows:—

Arrondissement.	Situation.	Area in Square Miles.	Communes.	Population. 1831.	Population. 1836.
Draguignan	Central.	1096	60	86,709	86,873
Brignoles	N.W.	786	61	71,062	71,156
Grasse	E.	442	61	65,488	66,363
Toulon	S.W.	500	28	94,242	99,012
		2814	210	317,501	323,404

In the arrondissement of Draguignan are—Draguignan, population in 1831, 9070 for the town, or 9804 for the whole commune; in 1836, 9794 for the commune [DRAGUIGNAN], on the Artuby or Artubie: Callas, population 2149 for the town, 2268 for the whole commune, on the Endre; Bargemon or Bargemont, population 1751 for the town, or 1891 for the whole commune, on the Douce, a small affluent of the Endre; Saillans and Fayence, pop. 1673 for the town, or 2554 for the whole commune, on or near the Riou or Bianson, which flows into the Siagne; Aups, pop. 2709 for the town, or 3083 for the whole commune, on the Braque; Salernes, pop. 2415 for the town, or 2510 for the whole commune, at the junction of the Braque and Bresque; Lorgues, pop. 4027 for the town, or 5444 for the whole commune, on the road between Brignoles and Draguignan; Le Luc, pop. 2856 for the town, or 3580 for the whole commune, on the road from Toulon to Fréjus and Antibes; and St. Tropez, pop. 3736 for the commune, and Fréjus, pop. 2487 for the town, or 2665 for the whole commune [FREJUS], on the coast. Callas has flour and oil mills; coal is found in the neighbourhood. Bargemont was the birth-place of Louis Moreri, compiler of the well-known 'Dictionnaire Historique.' Earthenware, glass, and leather are made at Fayence; and at Salernes trade is carried on in wine, oil, silk, and figs, which last are accounted excellent. Lorgues has oil-mills, and six important fairs in the year for corn, oil, and fruit. At Le Luc, woollen yarn, woollen cloth, corks, salt of saturn (acetate of lead, reduced to a fine powder and boiled with vinegar), brandy, and morocco and other leather are made; and considerable trade is carried on in oil, wine, and the fine chestnuts grown in the neighbourhood. St. Tropez is on the south side of the gulf of Grimaud: it presents the only harbour between Toulon and Antibes; but the harbour is small. It is defended by a citadel on the east side of the town, which consists chiefly of old houses. The townsmen manufacture corks, hats, and brandy; there is a ship-builder's yard for merchantmen and fishing vessels; and the coral, anchovy, and tunny fisheries are actively carried on. The exports are wine, oil, wood, honey, chestnuts, raw and [illegible] cork, and tunnies, anchovies, and other salt provisions. St. Tropez has a commercial court, a council of prud'hommes for the fishermen, and a royal school for navigation.

In the arrondissement of Brignoles are—Brignoles, or Brignolles, population in 1831, 5432 for the town, or [illegible] for the whole commune; in 1836, 5652 for the commune [BRIGNOLLES or BRIGNOLES], on the Calami; Barjols, pop. 3512 for the commune [BARJOLS], on a small affluent of the Argens; St. Maximin, pop. 3381 for the town, or [illegible] for the whole commune, on the road between Aix and Brignoles; Pignans, pop. 2291 for the town, or [illegible] for the whole commune, on the road between Toulon and Fréjus; and Cotignac, pop. 3602 for the commune, in the country between the Bresque and the Argens. St. Maximin has some manufactories for cotton yarn and woollen stuffs, some brandy-distilleries, marble-quarries in the neighbourhood, and some trade in saffron. There are a school of arts and trades, a public library of 3000 vols., and a handsome church formerly belonging to the canons of St. Augustin. Pignans has copper-works, and paper and fulling mills. Cotignac has tan-yards and a manufactory of organzine silk; and carries on trade in wine, silk, figs, and especially dried fruits and preserves.

In the arrondissement of Grasse are—Grasse, population in 1831, 7552 for the town, or 12,716 for the whole commune; in 1836, 12,825 for the commune [GRASSE], on the road from Draguignan to Antibes and Nice; La Roque on the Esteron; Vence, population [illegible] for the commune; and St. Paul, in the country between the Var and the Loup; and Cannes, population 3720 for the town, or 3994 for the whole commune [CANNES]; and Antibes, population 5565 for the commune [ANTIBES], on the coast. Vence was the seat of a bishopric as early as the fourth century. The Romans called the town Vintium; in Ptolemy it is [illegible] it was the chief town of the Nerusii. Some Roman inscriptions and other antiquities have been dug up, and are built into the wall of the court-yard of the ex-episcopal residence. Vence is an ill-built town, but the principal street makes a pleasant promenade, being shaded by lofty elms and watered by a clear stream. The neighbourhood produces wine, oil, figs, and, in one part, oranges. St. Paul is surrounded with antient walls: the neighbourhood produces excellent wine.

In the arrondissement of Toulon are—Toulon, population in 1831, 24,121 for the town, or 28,419 for the whole commune; in 1836, 35,322 for the commune [TOULON]; and La Seine, or Seyne, population 4756 for the town, or [illegible] for the commune, on the roadstead or harbour of Toulon; Soliés or Solliés-le-Pont, population 2898 for the town, or 3493 for the whole commune; and Cuers, population 4601 for the town, or 5106 for the whole commune, on the road from Toulon to Fréjus; Hyères, population 8270 for the town, or 10,142 for the whole commune [HYERES]; and Bormes, on the road from Toulon to St. Tropez; Ollioules, population 1944 for the town, or [illegible] for the whole commune, on the road from Toulon to Marseille and Paris; and La Cadière, near the coast, west of Toulon. La Seine is a well laid out and well built town, with large quays, a good port, and a small ship-building yard: it is at the western end of the inner road of Toulon, about three miles from that town. One or two government officers, connected with the management of the navy, are posted here; and the tunny and sardine fisheries are actively carried on. Soliés-le-Pont is on the river Gapeau; the neighbourhood comprehends some of the best grass-lands in the department. At Cuers trade is carried on in wine, brandy, olive-oil, capers, and figs. The orange grows in the open ground near this town, as also near Ollioules, where the pomegranate is grown, and an abundance of olives. Ollioules is at the Toulon end of a defile or pass on the Marseille and Toulon road: the townsmen trade in olive-oil, and in figs, raisins, and other dried fruits. Coal is found near La Cadière.

The population, when not otherwise described, is from the census of 1831.

The department constitutes the diocese of Fréjus, the bishop of which is a suffragan of the archbishop of Aix, Arles, and Embrun. It is in the jurisdiction of the Cour Royale and of the Académie Universitaire of Aix, and is included in the eighth military division, of which the d -quarters are at Marseille. It sends five members to Chamber of Deputies. In respect of education it is least was) one of the most backward of the French artments. Of the young men enrolled in the military sus of 1828-9, only 23 in every 100 could read and e ; the average of the departments being above 39 in ry 100.

n the earliest historical period this part of France was upied by a number of small tribes, Celtic or Ligurian. ng the coast, near Toulon, were the Commoni (Κωμ- οί, or Κωμονοί, Ptolemy), a name which Adrien de Valois pects to be erroneously put for Cenomani: they inha- d the coast from Marseille to Fréjus. The Camatullici Pliny were probably a branch of these, at any rate they upied a portion of the same district. The coast east of jus was occupied by the Oxybii, or, as Pliny writes the ne, Oxubii (Ὀξύβιοι, Polybius), and Deciatae (Δεκιῆται, ybius), or Deciates (Pliny), or Deciatii (Δεκιάτιοι, lemy), both Ligurian tribes. The more inland parts, out Vence, were occupied by the Nerusii (Νερούσιοι, olemy), or Nerusi (Pliny); and the hilly country, north Draguignan, by the Suetrii (Σουήτριοι, Ptolemy), or etri (Pliny); the valley of the Argens, about Draguignan l Brignoles, by the Sueltri (Pliny), or Selteri (Peutinger ble), from whom De Valois and D'Anville suppose the ne of the mountain tract l'Esterel, near Fréjus, to be ived. More inland than these, about Verignon, a vil- e near Aups, may be placed the Verrucini of Pliny. e north-western side of the department belonged to the yes (Σάλυες, Strabo and Ptolemy), or Salluvii, who were o Ligurians. Pliny mentions the Ligauni as adjacent the Oxybii; but the position of this people, mentioned no other author, cannot be ascertained.

The islands of Hyères were known to the Greeks and mans as the Stoechades (Στοιχάδες, Ptolemy), *i.e.* the anged islands, a name indicative of their position in a e east and west: the three largest were called Prote οώτη, *i.e.* the first, nearest to Marseille), now Porque- lles; Mese (μέση, the middlemost), or Pomponiana, now rtecros; and Hypaea (ὕπαια, the last), now Ile du Levant. ome smaller islands were included under the name Stoe- hades. The Sturium, Phoenice, and Phila of Pliny can- t be identified, but were probably three of the islets or cks which are found to the east of the Stoechades. YERES.] The islands which Strabo calls Planasia (Πλα- σία) and Leron (Λήρων), and Pliny and the 'Antonine aritime Itinerary' call Lerina, or Lirina and Lero, may readily identified by their name and their description near Antipolis, with the Iles Lerins, St. Honorat, and e. Marguerite. The Stoechades were cultivated by the assilians, who placed a garrison there to protect them m robbers. Planasia (or Lerina) and Leron were inha- ted, and the latter had a temple or place consecrated to e hero Leron, from whom we may suppose it had its me. (Strabo, lib. iv.) Pliny says that in Lerina there s a tradition or memory of a town called Vergoanum.

The river Var was known to the antients as the Varus αρος, Strabo), and was antiently, as now, the boundary Gaul and Italy; the Argens was known as the Argen- ts ('Αργέντιος, Ptolemy) or Argenteus. Polybius mentions river Apron (Ἄπρων) in the territory of the Oxybii, pos- ly the Loup. Ptolemy mentions a Cape Citharistes ιθαριστής), which must be carefully distinguished from rt Citharista, which was more to the westward, nearer assilia, and whose name may be traced in Ceireste, near a Ciotat. Cape Citharistes was probably Cape Sicié, near ulon. The Sinus Sambracitanus of the 'Maritime inerary' of Antoninus is identified, by a deed of the iddle ages, with the gulf of Grimaud.

Among the most antient towns in this part of France ere the colonies of the Massilian Greeks, Olbia (a name hich Anville thinks may be traced in the Port d'Eoube, st of the roadstead of Hyères), and Antipolis, now An- bes. The name of Athenopolis, not mentioned by Strabo, ut placed by Pomponius Mela between Antipolis and lbia, indicates a Greek origin, and Pliny mentions it as ne of the Massilian towns. Its site is not ascertained. he name of Heraclea (distinguished from other towns so alled as Heraclea Caccabaria) is also Greek: D'Anville ould fix the position of it at St. Tropez, but, we think, roneously. Polybius mentions Aegitna (Αἴγιτνα) as a own of the Oxybii, taken by the Romans under the con- ul Opimius (B.C. 154): it is probably the same place which Strabo mentions by the name of the Oxybian port (ὁ Ὀξύβιος λιμήν). We are inclined to identify it with the little port or road of Agay, a few miles east of Fréjus: possibly the name Agay, which in the eighth century was written Agathon, may preserve a fragment of Aegitna. D'Anville is disposed to place Aegitna near Cannes, and to identify Agay with Athenopolis; but, we think, without sufficient reason.

This department was included in the early Roman province (provincia) of Gaul, the transalpine portion of which was afterwards distinguished as Narbonensis. On the subdivision of Narbonensis, the greater portion of the department was included in Narbonensis Secunda, but the eastern extremity was included in the province of Alpes Maritimae, or the Maritime Alps. Augustus Cæsar established a naval station at Forum Julium, or Forum Julii, now Fréjus. A century ago the name was commonly written Fréjuls. Telo Martius, now Toulon, had a government 'baphium,' or dye-house, in the later period of the Western Empire. Other Roman towns may be certainly or probably identified: Ventium (Οὐέντιον, Ptolemy) with Vence; Salinæ (Σαλῖναι, Ptolemy), a town of the Suetrii or Suetri, with Saillans in the arrondissement of Draguignan; Forum Voconii or Voconi, with Gonfaron, between Pignans and Le Luc; Matavonium, or Matauvonium, with a place called Vins, a few miles east of Brignoles; Ad Turiim or Turrem, with Tourves or Turves, between Brignoles and St. Maximin; Tegulata, with a spot just on the border of the department, on the road between Aix and Brignoles; and Ad Horrea with Cannes. Forum Voconii, Matavonium, Ad Turrim, Tegulata, and Ad Horrea are mentioned in the Antonine 'Itinerary,' and some of them by other writers. Alconis, a station in the 'Maritime Itinerary,' cannot be identified with any approach to certainty. The history of the department in the middle ages is comprehended in that of Provence. [PROVENCE.]

(Malte-Brun, *Géographie*; Vaysse de Villiers, *Itinéraire Descriptif de la France*; Millin, *Voyage dans les Départemens du Midi de la France*; D'Anville, *Notice de la Gaule Ancienne*; Bouquet, *Recueil des Historiens des Gaules et de la France*, tom i.; *Dictionnaire Géographique Universel*.)

VARALLO. [SESIA, VAL DI.]

VARA'NIANS. [VARANIDÆ.]

VARA'NIDÆ, a family of Lizards, designated by MM. Duméril and Bibron as *Platynote* or *Broad-backed Saurians*, and thus characterised by them:—

1. Body very much elongated, rounded, and without a dorsal crest, supported on strong legs and feet, with distinct and very long but unequal toes. Tail slightly compressed, at least twice longer than the trunk.

2. Skin furnished with enchased scales, which are tuberculous, projecting, rounded upon the head as well as upon the back and sides, always distributed in rings or circular bands, parallel under the belly and round the tail.

3. Tongue protractile, fleshy, similar to that of the serpents, that is to say, capable of elongation and of being withdrawn into a sheath, narrow, and flattened at the base, and deeply divided and separated into two points which can be divaricated as in the Ophidians.

These three principal characters, MM. Duméril and Bibron observe, suffice to distinguish the Varanians from the seven other families comprised in the order Saurians; but certain negative characters appear upon a comparison with those families confirmatory of those distinctions.

1. The *Crocodilians* have the toes on the posterior feet constantly united at their base by membranes, and some of them are always deprived of claws. Their skin is protected by scutes or scutcheons, with protecting ridges, and their belly covered with squared plates. Their tail is furnished with a double or single crest, and their tongue is adherent and not protractile. Differences occur also in the form, number, and implantation of the teeth; the disposition of the pupil; the approximation of the external orifices of the nostrils; their prolongation in the thickness of the bones of the face; the opercular bones of the ear; and the conformation of the male organ, which is always simple.

2. The *Chameleonians* have, it is true, the tongue very extensile and received into a sheath, but it is vermiform and terminated by a blunt tubercle. Their toes are not separated, but form a sort of claw or pincer, so to speak,

composed of two equal and opposable packets. Their tail is nearly of the length of the trunk: it is prehensile, recurves downwards, and serves the animal for grasping. The body is compressed and carinated; the eye very large, and furnished with only one lid, which is very much developed and circular; and there is no apparent external auditory conduit.

3. The *Geckotians* have the tongue wide, flat, and hardly notched at its free extremity; their body is stout and short; the toes are wide, flat, and nearly of equal length. The eyes are large and the lids excessively short.

4. The *Iguanians* differ especially in the structure of the tongue, which is without a sheath at its base, and has the point alone notched. They have most frequently a crest or dorsal ridge and a goitre or throat-pouch: the scales which cover their skin are partially free, and placed one on another like tiles: many have palate-teeth and the maxillary-teeth are of an entirely different form.

5. The *Lacertians* are distinguished from the *Varanians*, with which they have nevertheless very great relations: 1st, in the presence of polygonal plates which cover the head; 2ndly, in the form of the scales which cover the head and the belly, and in their tail, which is not compressed; 3rdly, in the form and disposition of the teeth, which are not set at a distance from each other, obtuse and conical, but placed on the same line, and trenchant at their summit in their antero-posterior direction.

6. The *Chalcidians* are easily distinguished at first sight by having their skin entirely covered with scales always similar to each other, regularly distributed in rings or verticillations; because their trunk is so much elongated that it often confounds itself in the origin of the tail, and because it very often offers a fold or longitudinal groove upon the sides.

7. Lastly, the *Scincoidians* differ from the *Varanians*, because they have similar scales on all the parts of the body, constantly superposed nearly as in the fishes or the tiles of a roof.

To these purely differential characters, observe MM. Duméril and Bibron, are added a great number of others drawn from form, organization, and habits, as will be demonstrated hereafter. Nevertheless it is necessary to remark that the result of this examination is that the Varanians differ absolutely from all the species distributed in the seven other families by evident and easily seized peculiarities, as follows:—

From the *Crocodilidæ* in the toes, which are all furnished with claws, and never palmated at the base; in the cutaneous tubercles, which are neither square nor furnished with projecting ridges; in the protractile tongue; the form of the teeth, the pupils, the auditory conduits, and especially in the male genital organs, which are double. From the *Chameleonidæ*, because their tongue is forked at the point; their eyes furnished with two distinct lids, in addition to the auditory conduits; their body depressed instead of being compressed; and on account of the relative length of their tail, which is never prehensile. From the *Geckotidæ*, in the form and inequality of the length of the toes, the movements of the tongue, and the presence of moveable lids. From the *Iguanidæ* in the scales of the trunk, the absence of a dorsal crest, and the vaginal conformation of the tongue. From the *Lacertians*, in the difference of the teguments of the head and body and the form of the teeth. Finally, from the *Chalcididæ* and the *Scincidæ* in the non-rounded form of the trunk, the distinct origin of the tail, the structure of the tongue, and especially in the form and disposition of the scales.

SYSTEMATIC ARRANGEMENT.

Linnæus arranged these Saurians under the great genus *Lacerta*. Daudin separated the larger portion of the species under the generic appellation of *Tupinambis*, a name which owes its origin to the following error:—Marcgrave, in his Latin 'History of Brazil,' notices a Monitor which the Brazilians called *Teju Guazu*, and the Tupinambians *Temapara* ('Brasiliensibus Teju-Guazu et Temapara Tupinambis'). Madame Merian seems to have been the first who used the term *Tupinambis* thus erroneously, and she was followed by Lacépède. Thus, as MM. Duméril and Bibron observe, the name of the people was taken for that of the animal, and the mistake has become the more singular, inasmuch as by a misprint, which is repeated in many works, the word has been turned into '*Tupinambisou*, Sauve-garde d'Amerique,' the [illegible] *ou* having been united thereto.

Cuvier, the same authors remark, while he leaves [illegible] genus in the family *Lacertians*, forms from it nevertheless a first group under the denomination of 'Monitors properly so called;' but it unfortunately happens that [illegible] true *Monitor avertisseur*, or Safe-guard of America, [illegible] arranged in another group, because it is in fact more approximated to the lizards. [SAUVE-GARDE.]

Oppel adopted Daudin's genus *Tupinambis*, as do [illegible] Duméril and Bibron themselves in the *Zoologie* [illegible]*tique*; but they think that with the characters which [illegible] assigned to it many species which Daudin introduced [illegible] it must be separated from it.

Merrem admitted Daudin's genus with all the [illegible] but rejected Daudin's name, Latinizing the Arab [illegible] the Monitor of the Nile, *Ouaran* [MONITORS], by [illegible]ing it into *Varanus*.

Fitzinger separated these Saurians into a distinct [illegible] under the name of Ameivoids, in which he places [illegible] greater part of the true Varanians, the Monitors [illegible] Ameivas, and the Tejus or Safe-guards, with many [illegible] genera, of which the fossil fragments only were known [illegible] him.

Mr. J. E. Gray, in his Synopsis (1827), arranged [illegible] his family *Varanidæ* the genera *Varanus* and [illegible] of Merrem, which he very well characterised. [illegible] family as the *Varanidæ* appears in Mr. Gray's Table published in the British Museum Synopsis (1842), [illegible] *Monitoridæ* (which are the first family of the [illegible] the first group of his *Sauria*) consist of the genera [illegible]*mosaurus*, *Monitor*, *Polydædalus*, *Empagusia*, and [illegible]*saurus*. The *Helodermidæ*, with the single genus *Heloderma*, are the second family; and the *Teidæ* are the third, with the genera *Teius*, *Ctenodon*, *Acrantus*, [illegible] *Aporomera*, *Cremidophorus*, *Dicrodon*, *Centropyx*, [illegible] *Crocodilurus*, *Custa*, and *Callopistes*.

Mr. Swainson, in his *Natural History and Classification of Fishes, Amphibians, and Reptiles* ('Cab. Cyclop.' [illegible] makes the *Lacertidæ* the third family (the *Iguanidæ* being the second) of his *Saures* or *Lizards*, with the following

Family Character.

Body long, slender, smooth, elegant, without spines [illegible] the head and back, and very rarely on the ridge of the tail; toes free; tongue lengthened, slender, deeply [illegible] and capable of great extension; scales of the [illegible] belly placed in smooth transverse parallel bands. [illegible] typically, very long, attenuated, and generally round.

Genera.

Hydrosaurus, Sw., with the subgenera *Hydrosaurus*, Wagl. (including *Polydædalus*, Wagl.); *Empagusia*, Gray; *Odatria?* Gray; *Varanus*, Fitz.

Heloderma, Wagl.

Lacerta, Linn., with the subgenera *Lacerta*, [illegible] Cuv.; *Scapteira*, Fitz.; *Acranthus*, Wagl.; and [illegible] Daud.; with a query whether the last is not the [illegible]saurus of Wagler.

Zonurus? with the subgenus *Cicigna* of Gray.

Leiolepis, Cuv.

The *Lacertidæ*, in Mr. Swainson's arrangement, are immediately followed by the *Agamidæ*.

Wagler had previously separated the *Varanians* [illegible] earnest, by placing them at the end of the order *Sauria*, and very near to that of the *Ophidians*, to which [illegible] they bear resemblance in the form of the bones of the cranium and face, and especially in the configuration [illegible] structure of the tongue; but, as MM. Duméril and Bibron observe, by a forced analogy drawn from this last part, he places them after the chameleons, which he arranges [illegible] fourth family. The Varanians of MM. Duméril and Bibron are, according to Wagler, *Thecoglossal* [illegible] *Lizards*, and he divides them into four genera:—1. *Heloderma*, after Wiegmann; 2. *Hydrosaurus*; 3. *Poly*[illegible]*lus*; and 4. *Psammosaurus*, after Fitzinger. These [illegible] are thus characterised by Wagler:—

1. *Heloderma*. Nostrils situated on the sides of [illegible] point of the muzzle, between three great scales; [illegible] the back covered with tuberculous, osseous, homogeneous plates; belly furnished with oblong, flat, squared scutella [illegible] One species only known. *Locality*, New Spain or Mexico.

2. *Hydrosaurus*, Wagl. Nostrils lateral, situated in the anterior angle of the muzzle, near its extremity; scales [illegible]

back small and shagreened; tail annulated, compressed rally; teeth slender, with serrated edges. *Locality* of :ies, Asia and New Holland.

. *Polydædalus*, Wagl. Nostrils situated between the ; and the point of the muzzle, placed very high and iediately under the external angle of the muzzle; their ce is elongated, oblique, and half-closed in front by skin; the scales of the back are disposed in bands, are close-set, oval oblong in form, projecting and humped t were in the middle, and surrounded by a granulated ler. The posterior maxillary teeth are very straight. posterior feet are robust, straight, and entire. *Lo-ty.*—The species are inhabitants of Africa and the East ies.

. *Psammosaurus*, or Sand-Lizard. Nostrils situated in it of the eyes, presenting elongated oblique orifices; sal scales resembling those of Polydædalus; tail nded, but subtriangular towards the point or free ex-mity.

MM. Duméril and Bibron appeal to the descriptions of cies, and the synonymy as collected by them in proof of ir observation that Wagler did violence to the laws usu- admitted as governing natural methods, in thus distri-ing among four genera the seven species which he has erred to this division of the *Thecoglossæ*.

IM. Duméril and Bibron are of opinion that the *Vara-ns* are not susceptible of being divided into more than natural genera, *Varanus* and *Heloderma*. The cha-ers on which distinctions among the species of the first it rest—characters drawn from the conformation of the . the more or less advanced position of the nostrils on sides of the muzzle, or some slight differences in the n of the teeth—do not appear to them of sufficient im-ance to warrant a separation of animals which resem- each other so much in other respects.

'or, they observe, it must be allowed that the round- presented by the tail of some species is far from being fect. A certain degree of flatness always exists in that t, which is not absolutely deprived of a crest or carina-tion more or less developed in the *Varanians* which ve this terminal portion of the body compressed. If the th be considered, it will be found that they change ir form with age, and that *Varanus Niloticus*, for ex-ple, before it has them tuberculous, has them com-ssed, like those of *Varanus varius*, or some other which been placed in a different genus. Finally, they ask ether two species can be reasonably separated methodi-ly, because one has the nostrils situated at the end of muzzle, and the other at an equal distance from the and the end of the nose; especially when there exists ird in which these nostrils are situated neither at the ldle nor at the end of the sides of the muzzle, but po-vely between these two points?

ORGANIZATION.

The structure of the Varanians merits peculiar atten-n. Not only does their skeleton generally, and their nium particularly, indicate the natural passage from the er of the lizards to that of the serpents, but we find in great extinct Saurians, such as *Megalosaurus* and *Mo-saurus*, the closest resemblance to the comparatively iinutive Varanians which are now inhabitants of our be.

Skeleton.—The bones which compose the cranium of *ranus Niloticus* form an elongated, depressed, and blunt-nted cone, with the frontal and parietal regions flat. e orbits are round and occupy its mesial part; the strils open in the palate nearly at the height of the orbits. ere is only one intermaxillary bone, which holds four th on each side: it ascends by means of a compressed ophysis up to the middle of the nostrils to unite itself to imilar projection of the nasal bone, which is unequal, d which, enlarging at the upper part, bifurcates to unite elf to the two frontals. These last, placed between the bits, have a lamina below, which, approximating itself ciprocally, completes the canal of the olfactory nerves. ie maxillaries receive in front the enlarged part of the termaxillary bone, which has below, behind the teeth, projecting apophysis by which it unites itself, by means a groove, to the vomerine bones which occupy the iddle of the palate. These same maxillary bones form so the sides of the muzzle or the cheeks. The anterior ontal and the lacrymal offer nothing worthy of particular notice; but the jugal bone is nothing more than an arched and pointed stylet, which neither reaches the posterior frontal nor the temporal, so that the orbit is incomplete as in the Geckos.

The supraciliary bone, *os surcilier* of Cuvier, is a portion uniting itself to the enlarged part of the orbital border of the frontal bone which protects the eye above, and which is found in the birds. The fronto-parietal suture is nearly straight and transversal. On the external limits of this line are articulated on the two bones the posterior frontals, which, prolonged backwards into a slender apophysis, unite obliquely to the temporal bone to form the zygomatic arch. The parietal bone is unequal, in the form of a shield enlarged anteriorly: the temporal fossæ are hollowed on its sides; and behind it is forked. Towards the middle of this parietal bone is a hole which corresponds to the centre of the cranium. In the posterior notch of the parietal bone is lodged the upper occipital, which has, entirely, the form of the annular portion of a vertebra. The tympanic bone, which serves for the articulation of the jaw, is solid, nearly straight, and of prismatic form. The floor of the cranium is concave, and is hollowed on the basilary and sphenoid. The pituitary fossa is large, and separated from that of the brain by a projecting lamina of the last-named bone. The palatines are short, and are united to the vomers, the anterior frontals, the maxillaries, the transverse, and the pterygoids; they form on each side a part of the floor of the orbit, and the pterygoidians seem to make the rest. They abut upon the lateral apophysis of the sphenoidal bone, and terminate behind in a point. On the middle of the upper part of the pterygoidians is articulated a bony rod-like process, named by Cuvier the columella.

The vomers which correspond to the middle of the palate extend from the intermaxillary to the palatine bones: they are hollowed anteriorly into a little canal.

At the anterior part of each nostril below is a bone excavated into a spoon-shape.

Some account of the teeth of the *Varanians* will be found in the article SAURIANS, and figures of the cranium and lower jaw of the Monitor of the Nile are given in the article MONITORS. Wagler[*] particularly points out, with reference to the approximation of the Varanians to the serpents, the manner in which the bones of the face seem to be suspended to the cranium, and are capable of movement and separation transversely up to a certain point; the incomplete circle of the orbit; and the feeble junction of the symphysis of the branches of the lower jaw.

Of the teeth we have only space to observe that they are always flattened at the root, which is lodged in the length of a furrow constituting a common alveolus or socket having no internal border. The crowns or free portions of the teeth are most ordinarily pointed and curved backwards. There are no palatal teeth.

The os hyoides is framed of slender elongated parts, of which the median or unequal part constituting its body, or the lingual bone, is shorter than the horns, four in number, two before and two behind, each formed of two articulated pieces, the anterior of which present a remarkable enlargement at the point where they move upon each other.

The spine offers many peculiarities. The region of the neck, although it consists of seven vertebræ, is nevertheless more elongated in proportion than it is in the other Saurians, which gives a particular character to the animal. The last of these cervical vertebræ are furnished with asternal ribs or articulated transverse apophyses, which are not joined at the sternum. There are indeed only four ribs on each side, which are prolonged to articulate themselves, really, with it. The others, fifteen or sixteen in number, are entirely free, and sustain the abdominal parietes. It is difficult to distinguish two lumbar vertebræ: nor are there more than two pelvic or sacral, which are however remarkable for the size and solidity of their transverse apophyses. These last eminences proceed enlarging considerably in the first vertebræ of the tail, and then diminish considerably, so as to become entirely obliterated in the numerous series of caudal bones, which amount to above twenty-four in some individuals, when the tail has not been mutilated, for then the replacing pieces remain cartilaginous and hardly distinct from each other.

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[*] 'Natürliches System der Amphibien.'

The sternum is joined and strengthened by the anterior or lower bones of the shoulder. It is formed anteriorly of an elongated, single, and very solid piece, which dilates anteriorly into two lateral branches, considerably prolonged and a little curved backwards. The posterior extremity of this median bone is carried backwards so as to penetrate into a sort of cartilaginous plastron of a rhomboidal or square form, two sides of which are directed forwards to receive the clavicles, coracoid bones of Cuvier: on the posterior border the two pairs of ribs are joined; and it is on the posterior point of this rhomb that the third pair of sternal ribs abut, by a common piece.

The humerus is strong and solid. The shoulder-blade is solidly united and blended with the clavicles and the coracoïd bone, and it is at the point of their union that the cavity or articular notch is formed in which the head of the humerus moves.

The pelvis offers nothing peculiar: the three pieces which form it concur in the production of the cotyloid cavity. The ilium is elongated and carried backwards, so as to articulate with the two sacral or pelvic vertebræ. The pubis and the ossa ischii are very much opened out, very distinct, and, as they do not join, they leave between them a considerable aperture; so that there seem to be two pubic symphyses, one before and the other behind. This great interval is filled by an aponeurotic ligament which gives attachment to the muscles of the thigh.

The bones of the fore-arm have a slight resemblance to those of birds; but this member is without the hole by which the air coming from the lungs penetrates in those oviparous animals. Neither the bones of the fore-arm nor of the feet present anything worthy of remark.

But if the bones of the fore-arm bear some resemblance to those of birds, all resemblance is lost in the thigh-bone, which, as Cuvier has remarked, bears the greatest analogy both in form and position to that of the crocodile. It articulates with both fibula and tibia, and the patella works upon a median pulley. The fibula is very much widened and flattened at its tarsal extremity.

Those who would study the *muscular structure* of the Varanians will find ample descriptions in the works of Cuvier (*Anatomie Comparée*), of Meckel, and of Carus. Their motions seem to be much the same with those of the generality of Saurians, and, as far as travellers have had an opportunity of observing, they scarcely ever climb, and consequently live neither in trees nor upon rocks. Some inhabit the sandy tracts of the warmer countries; and these have a rounded and conical tail: they are essentially terrestrial, and have sometimes been designated as terrestrial crocodiles, either on account of their general form or with reference to their size. Others frequent the banks of rivers and lakes, which they traverse by swimming, and into which they even drag their living prey, uniting together to attack it in the water and drown it.

There is nothing in the anatomy of the brain, nor in that of the organs of the senses, to call for special notice; but

The integuments have a peculiar disposition in that which is termed by the Germans, in Latinized Greek, *pholidosis*, and by the French *ecaillure*, or arrangement and disposition of the scales. The whole surface of the skin in the *Varanians* is covered with non-imbricate tubercles, most frequently arranged in transverse series; whilst those of the lower part of the body, although very nearly equal to each other, differ slightly, according to the regions which they cover. In general, they are slightly tuberculous or rounded; but with the centre more elevated than the disk, and each of them is sometimes found kernelled, as it were, by an annular series of small, very regular projecting points, whose symmetry is such as to form a sort of ornament. The *Polydædalus* of Wagler is named from this peculiarity. The lower part of the body presents transverse series which are more regular, but its small plates are flat, elongated, and nearly hexagonal. The scales that cover the cranium are not similar to those of the back, but flat: the contrary of this is seen in the species which Wiegmann made known under the name of *Heloderma*. The tubercles with which the lower part of the jaw is furnished vary in their extent. The most external, those which cover the borders of the lips, are the largest, and irregularly rounded and distributed; but those of the median region form longitudinal parallel lines which decrease from the end of the jaw to the neck. Towards the median line there seems to be a [illegible] tudinal furrow, so as to permit the divarication of the [illegible] branches of the lower jaw, as in the serpents. There [illegible] collar or semicircle of great scales beneath and in front [illegible] the breast, as in the *Lacertæ*; but there is a trans- fold of the skin, and the granulations which correspond with it are much smaller. All the lower part of the [illegible] and limbs is, generally, of a paler tint, and furnished with smooth regular plates, which are described in form a [illegible] quincunx under the thighs. The upper part of the [illegible] covered with scales similar to those of the back, generally dotted or coloured in the same manner. The tail participates also in the distribution of the scales both above and below; but here they are generally disposed in transverse or annular bands, with this peculiarity, that the lower bands are so large that they correspond to three [illegible] four rows of the upper ones. There are no pores [illegible] thighs, and the cloaca is a transverse slit, the anterior and posterior borders or lips of which are not covered [illegible] scales of a particular form.

The rounded, elongated toes amount to five [illegible] foot. They are entirely distinct, and separated from the base, of unequal length, and always furnished with claws. On the fore-feet the thumb or internal toe is the shortest; nevertheless it reaches to the penultimate phalanx of the second toe. In length the external toe comes next [illegible] the second, and, lastly, the third: but the inequality [illegible] still more remarkable in the hind-feet; for the four internal toes successively increase in length. The fourth [illegible] three times longer than the great toe, while the fifth is intermediate in length with reference to the two first, and much more free or independent in its movements. In this respect the feet of the Varanians bear the greatest analogy to those of the *Lacertæ*, properly so called, or [illegible]

The colour of the skin varies from black to more or less deep green, with spots which seem to depend on the tubercles, the tints of which, variously grouped, offer more or less regular designs, and represent mosaic work, [illegible] that the skin of the Varanians may be employed in the arts like shagreen. It is composed of a very solid [illegible] cuticle, and the granulations of horny matter—sometimes they are even calcareous—are disseminated with the greatest symmetry.

The *nostrils*, with reference to their external orifice, vary slightly in different species; nevertheless they are always lateral, but more or less approximated to the muzzle. Their course is short: they open in the mouth by means of two longitudinal slits in the concavity of the palate, in front of the corresponding region of the [illegible] the orbits. The species which frequent the water have a sort of pouch or cavity, serving as the entrance of the nasal fossæ; whilst in the species which are entirely terrestrial the slit is larger, more elongated, and more approximated to the orbit. It is nevertheless very probable that the nostrils and the conduits serve more for the act of respiration than the perception of odours.

The *tongue* of the *Varanians* presents a particular character. It is fleshy, very extensible, and can be [illegible] to double the length of the head. For three-fourths of [illegible] extent its form is cylindrical, and its fourth part forms two conical points, divested of papillæ, but covered with a horny, delicate, flexible epidermis; these portions can be divaricated, as if the tongue was regularly split longitudinally. There is indeed to be seen below a longitudinal furrow in the papillose and fleshy region, whence the name of *Fissilingues* applied by some authors to the group. This tongue has the power of re-entering [illegible] more than half its length into a sort of scabbard or sheath, and it is, most frequently, coloured in the part which remains out of the case, where it may be distinguished by its tint, even when the reptile does not protrude it.

The *eyes* are large, set in the median part of the head and on the same line as the nostrils. The moveable lids are delicate, and their teguments are very finely granulated: their commissure is on a horizontal line, and is very much elongated. The lower lid is much the largest, and seems endowed with more power of motion than the upper one, which remains, almost always, lowered. In other respects the eye does not differ from that of the *Lacertæ*.

The *auditory conduits* are very apparent, situated very low, and, so to speak, behind the cranium. They are placed at the posterior region of the commissure of the s, and have the appearance of a sort of obliquely transse rent: they are not deep, and leave visible the tym- nic membrane directed obliquely outwards, internally l backwards.

Neither the *digestive* nor the *generative organs* possess r peculiarity that would warrant the occupation of ce by a detailed account of them. (Cuvier; Duméril l Bibron; Wagler, &c.)

Habits, &c.

Next to the *Crocodilians*, the *Varanians* attain the atest size of any of the Saurians; indeed Herodotus, ian, and others regarded them as terrestrial crocos.

The *Varanians* are divisible into two distinct groups: : eminently terrestrial group, whose abode is far from : waters, in desert and sandy places; and the aquatic oup, consisting of those which inhabit the banks of ers and lakes.

The first have the tail entirely conical and nearly unded, and it would appear at first sight to be useless, if t in the animal's way: but as Nature makes nothing in in, Wagler's notion that it acts as a necessary counterise to the trunk is probably, so far as it goes, correct. e multitudinous bones which form the tail of the second : very well developed, particularly in their transverse ocesses, and offer strong points of attachment for the iscles: the upper and lower apophyses are comparatively eatly increased. Compressed throughout its entire length, s tail becomes a powerful organ of motion when the imal is in the water, particularly as it is often surmounted with a crest formed by one or two rows of flatted scales, a fit propelling oar for the body rendered oyant by the air with which the lungs are filled.

On land the Varanians run with rapidity, but their otion is always serpentine, a mode of progression due to eir long tail, which helps to push them forward d aids them in their leaps upon the prey which they rsue.

The *food* of the *Varanians* consists of animal matters, nd especially large insects, such as *Blattæ*, locusts, rickets, and beetles. It is asserted that they hunt after e *eggs* of birds and crocodiles, and that chameleons, nall tortoises, and fish have been found in their stomachs. l. Leschenault de Latour relates that they unite on the nks of rivers and lakes to attack quadrupeds which me to quench their thirst, and that he has seen them tack a young stag as he attempted to swim across a ver, in order to drown him. He even declares that he und the thigh-bone of a sheep in the stomach of one hich he dissected.

Such are the animals which in certain parts of their ganization come nearest to the great extinct Saurians of d. If the habits ascribed to these Varanians bore any lation to those of the great carnivorous Saurians now ept away from the face of the earth, we should have in ose annihilated giants no bad representatives of the agons of our wildest legends.

Geographical Distribution.

The family of Varanians, as modified by MM. Duméril d Bibron, exist in all parts of the world with the excepon of Europe.

America claims one only; that on which the genus *leloderma* is founded.

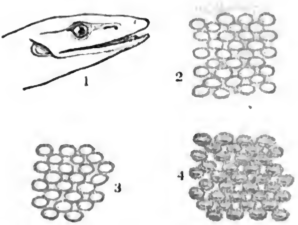
In Asia there are four *Varani* properly so called; three Africa;* and four in Oceania. Of these four, two have een observed in New Holland, one in the isles of the apous, and the fourth in the isle of Timor.

MM. Duméril and Bibron state that the locality of one pecies, *Varanus albogularis*, is unknown, but Dr. Smith btained it in South Africa: it thus makes a fourth African pecies.

Genera.

Varanus.

Generic Character.—Scales set at the side of each ther in the skin, and surrounded with an annular row of ery small tubercles. Back of the tail more or less renchant. A fold under the neck in front of the breast. Dum. and Bibr.)



1, Head of Varanus nebulosus; 2, dorsal scales of the same; 3, dorsal scales of Varanus Niloticus; 4, dorsal scales of Varanus Picquotii.

§ 1. *Terrestrial Varanians.*

MM. Duméril and Bibron notice but two terrestrial species, the *Terrestrial Monitor of Egypt*, *Varanus arenarius* (Dum. and Bib.), and *Varanus Timoriensis* of the same authors. But Dr. Smith has since given a very accurate figure and description of *Varanus albogularis*, the species whose locality was unknown to MM. Duméril and Bibron; and the form of the tail, &c., together with Dr. Smith's account of its habits, leaves little doubt that it ought to come in this section: we shall therefore select *Varani arenarius* and *albogularis* as examples of this section.

Varanus arenarius.

Description.—Form.—Head in the form of a four-sided pyramid. External apertures of the nostrils two oblique slits, situated on each side of the muzzle, a little in front of the eye. Teeth moderate, sharp, slightly compressed, and a little curved backwards; ear oval; upper part of the head paved as it were with small, flattened, many-sided scales. A circular scale, the largest of all, is situated on the vertex. The toes are perhaps proportionally rather shorter than those of the other species. Their inferior surface is furnished with small rounded tubercles surrounded by an annular row of granular scales. These tubercles are disposed in transverse rows of four or five each. The upper part of the toes is covered with oblong, quadrilateral scales, forming slightly imbricated transverse rows. Claws very long, very much compressed, pointed, and slightly curved. Tail nearly rounded for the first third of its extent, slightly flattened from right to left for the rest of its length, which is one-fourth more than that of the rest of the body, neck, and head together. If the upper part of the posterior half of the tail is occasionally surmounted with a keel formed of trihedral scales, as in many of the Varanians, the keel is but very little developed. The scales of all the parts of the body, except those of the upper part of the head and toes, whatever their form may be, are each surrounded with a row of small squamous grains. These scales are simply oval under the neck and the four limbs, and equally oval, but a little ridged on the upper region and sides of the body, conical on the upper part of the neck, circular on the arms, and quadrilateral oblong under the belly and on the whole extent of the tail, round which they form verticillations.

Colour.—This varies in individuals. MM. Duméril and Bibron state that the specimen brought by Geoffroy from Egypt is bright brown on the back, with some square spots of a greenish and pale yellow. Other spots, or rather transverse bands, of the same colour, are on the upper part of the tail. Two other specimens, which are less, are yellowish; but in one the colour is uniform, while in the other the yellowish colour is mingled with a brown tint, forming more than twelve transverse bands on the tail, and five only on the back, where besides there are, in the intervals between the bands, brown points, with which the upper part of the four limbs are sprinkled. On each side of the neck moreover are two brown ribands, which take their origin, one at the posterior angle of the eye, the other on the border of the ear. The claws are yellow.

Locality.—Egypt.

Habits.—According to M. Isidore Geoffroy, entirely different from those of the other Varanians generally, and from those of the *Varanus Niloticus* in particular. Instead of frequenting the banks of the river, it lives in dry places, a locality in unison with the conformation of the tail, whose rounded form is not proper for swimming. It is less carnivorous than the Monitor of the Nile: at least, in captivity, instead of throwing itself on its prey with avidity, it is only induced to take pieces of flesh by being crammed. (Dum. and Bibr.)

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* But see post.

MM. Duméril and Bibron state that this is the *Ouaran-el-hard* of the Arabs; the *Terrestrial Crocodile* of Herodotus; *Ouaran*, Forsk.; *Varanus Scincus*, Merr.; *Psammosaurus griseus* of Fitzinger; *Tupinambis arenarius*, Isid., Geoff.; *Le Monitor terrestre d'Egypte*, Cuv.; *Tupinambis griseus*, Daud.; *Psammosaurus scincus*, Wagl.; *Tupinambis arenarius*, Bory de St. Vinc.; *The Land Monitor of Egypt*, Griff.; *Monitor scincus*, Gray; *Varanus terrestris*, Schinz.

It is very probable that this is the Scink of the Antients.

Varanus albogularis.

Description.—Colour.—Head and neck intermediate between gamboge and ochre yellow, the former and the sides and back of the neck finely freckled by small black spots; from the outer corner of each eye a brown stripe extends along the neck, and terminates on the back immediately behind the base of the fore-leg, where it is much broader than at its commencement: this stripe is generally darkest at its edge and lightest along its centre: between the termination of these stripes there are in most specimens two large brown blotches separated from each other by a yellowish line. Back brown, crossed by three or four ochry yellow bands, which are either in the form of continuous stripes or interrupted blotches, and is besides variegated by smaller spots or waved narrow stripes of the same colour; the larger bands and blotches sprinkled with small brown spots. The sides ochry yellow with small brown spots and vertical stripes, the latter continued from the brown of the back; belly the same colour as the sides, with a sprinkling of small brown spots. Tail beneath ochry yellow; above and on the sides marked by alternate brown and yellow bands, the former spotted with yellow, the latter with brown. Outer surface of the anterior extremities ochry yellow spotted with brown; the posterior extremities dark brown spotted with ochry yellow; toes the latter colour with some indistinct brownish bars; nails dark horn-coloured.

Form.—Head rather small; neck and body robust, and rather flattened; limbs thick and strong. The head is quadrangular, rather short, broad behind, and tapered towards the nose; nostrils oblique, linear, and situated near to the eyes; teeth somewhat cylindrical and strong; obtuse in some specimens, pointed in others; external ear transverse and narrow; tail somewhat cylindrical towards the base, the remainder compressed above and surmounted by a distinct serrated carina with a slight channel along its upper surface; towards the tip of the tail this carina disappears. Upper surface of the head covered by flat, somewhat circular scales, rather small, particularly over the eyes; lips and temples covered with small scales, on the former oval, on the latter circular. On the nape and upper part of the neck the scales of a larger size than on any other part of the animal, more raised, and with the granulations surrounding the disks very distinct. On the back and sides the scales are disposed in waved transverse bands, and only differ from those on the neck in being of smaller size and less convex: on the tail they are arranged in regular rings; towards its base oval, and more or less completely margined by granulations; towards the tip oblong, subcarinated, and almost without any edging. On the chin, throat, and sides of the neck the scales are small and oval; on the breast somewhat circular; on the belly oval in transverse rows, and only margined behind by granulations; on the inner sides again they are smaller and nearly circular. The inner toe of hinder foot very short and robust; the outer one much removed from the rest; on the fore-foot the inner toe is shorter than any of the others, but longer than the corresponding one of the hinder foot.

Such is Dr. Smith's description of the male, from which, he says, the female differs but little in external appearance. The length of the specimen from which the description was taken was two feet eight inches from tip of nose to end of tail; but he adds that specimens are occasionally obtained which measure between four and five feet.

This species is the *Tupinambis gularis* of Daud.; *Varanus ornatus*, Merr.; *Tupinambis albogularis*, Kuhl; *Polydædalus albogularis*, Wagl., and *Monitor albogularis* of Gray.

Locality and Habits.—Dr. Smith did not obtain any specimens of *V. albogularis* south of Latakoo, but there is, he says, reason to believe that it occasionally occurs within the limits of the Cape Colony; and he adds that it is in all probability the animal which is called das adder by the colonists, and which is so much dreaded from the supposition that it is extremely venomous. 'It is usually,' continues Dr. Smith, 'discovered in rocky precipices or low stony hills, and when surprised seeks concealment in the chinks of the former, or in the irregular cavities of the latter; and when any irregularities exist upon the surface of the rocks or stones, it clasps them so firmly with its toes, that it becomes a task of no small difficulty to dislodge it, even though it can be easily reached. Under such circumstances the strength of no one man is able to withdraw a full-grown individual; and I have seen two persons required to pull a specimen out of a position it had attained, even with the assistance of a rope fixed in front of its hinder legs. The moment it was dislodged, it flew with fury at its enemies, who by flight only saved themselves from being bitten. After it was killed it was discovered that the points of all the nails had been broken previously, or at the moment it lost its hold. It feeds upon frogs, crabs, and small quadrupeds; and from its partiality to the two former, it is often found among rocks near to springs or running streams; which circumstance having been observed by the natives, has led them to regard it as sacred, and not to be injured without danger of drought.' (*Illustrations of the Zoology of South Africa.*)

Varanus albogularis. (Smith.)

AQUATIC VARANIANS.

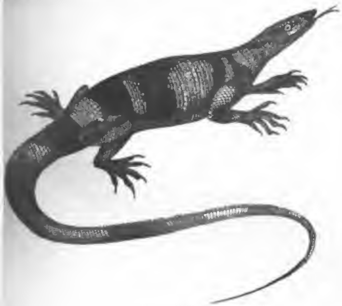
For an account of *Varanus Niloticus*, see the article MONITORS.

Varanus Bellii.

Description.—Form.—Head very much elongated, resembling a four-sided pyramid. Teeth long, slender, compressed, pointed, slightly curved, and very finely denticulated on their edges, twenty-four in each jaw. External apertures of the nostrils two rounded holes on each side of the muzzle, near its extremity. Flattened polygonal plates in juxtaposition cover the entire surface of the head. They are of two sizes: the less dilated ones are on the supra-orbital regions and on the sides of the cranium; the more dilated ones cover the middle of the vertex, the inter-ocular space and the upper part of the muzzle, the sides of which have nearly the same sort of scaly covering. The temples are protected by a pavement of small circular scales. On the nape are oval tubercles, each surrounded with a granulous circle, as are all the scales of the other parts of the body, those of the head and the upper part of the toes excepted. Though very much elongated, the toes are robust and armed with large crooked claws, which are sharp and very much compressed. On their inferior surface are transverse rows of square groups, each composed of twenty small granular tubercles. Their upper surface is protected by smooth, quadrilateral, oblong scales, forming transverse rows slightly imbricated. The tail is more than half the total length of the animal. It begins to put on a flattened form from right to left towards the second third of its extent; but the double scaly carina which surmounts it shows itself at a previous point. Groups of small granular tubercles, like those of the under part of the toes, pro-t the palms and soles of the feet. Oval and slightly vex scales cover the lower regions of the neck and bs; there are quadrilateral and flat ones above the ists, and very narrow and strongly carinated oval ones the neck, the back, and the four limbs. The pectoral les are oval and smooth, those of the abdomen and the are quadrangular, oblong, and with a longitudinal ina.

Colour.—Two very different tints: one deep black, the er pale yellow or whitish. The first colours all the er parts, and shows itself on the upper parts in nearly great proportion as the second. On the top of the head orms five rounded spots, placed in the same manner as five points of a die: behind these is a sixth spot on middle of the posterior region of the cranium: there is eventh sufficiently dilated to cover a portion of the occi- ; it forms a crescent on the nape. In front of the ulder the yellow colour dotted with black represents a se-shoe, whose branches extend to the right and left ng the neck. It shows itself, but always dotted with ck on all the other parts of the animal, under the form large transverse bands alternating with other bands of e black, of which colour the claws are.

Locality.—New Holland

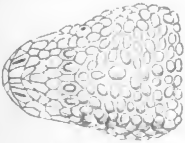


Varanus Bellii.

Heloderma. (Wiegm.)

Generic Character.—Scales or tubercles of the body ple or not surrounded with small squamous grains. il rounded. The fifth toe of the posterior feet inserted the same line with the other four. (Dum. and Bibr.)

The *Helodermns* have not the scales or tubercles with ich they are covered surrounded by small squamous ins like the *Varans*. The five toes of each of the pos- ior feet of the *Helodermata* are inserted on the same nsversal line, whereas in the *Varani* the fifth is at- hed to the tarsus, farther back than the others. The th differ too, from those of the Varans, for they are compressed. The tail of the Heloderms is rounded oughout its extent.



Head of Heloderma.

Example, *Heloderma horridum.*

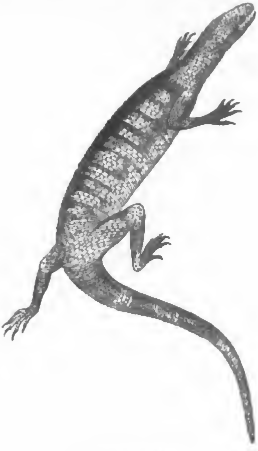
Description.—*Form.*—The teeth of this species are ender, nearly straight, very much pointed and hollowed to a deep channel. The head is in shape a tetrahedral yramid; it is flattened, and obtusely rounded at its an- rior extremity, on each side of which are the nostrils: ese last are nearly oval and circumscribed by three lates. The upper part of the nose is furnished with four scutules, the first of which are pentagons narrowed backwards, and the second straight rhombs. There are twenty upper labial scutules. The surface of the head, comprising the front, the vertex, and the occiput, is rough with large plates, or rather great osseous tubercles, whose contour, although many-sided, tends to a circular figure. These tubercles are disposed in annular rows, fitting one into the other. There are also tubercles, but of a conical form, which cover the surface of the back, where they are arranged in transverse lines. Small flat and smooth scales occupy the breast and abdominal region. On the anterior region of the one, they are rounded and disposed in order; whilst, more backward and on the entire surface of the other, they are of a triangular form and in transverse rows.

The four limbs are nearly of the same length. The arms are covered with osseous plates which are convex and nearly polygonal, and on the fore-arms are great flat circular scales. The anterior toes are not very unequal. The middle toe is the longest; then come the second and the fourth, which are a little shorter than the two external ones. The third and fourth hind-toes, whose length is the same, are the longest, and the fifth is the smallest. The external surface of the thighs and legs is protected by hemispherical tubercles and their internal surface by great subrounded and flat scales. All the toes are covered with nearly semilunar scutules, dilated across. The claws are curved, compressed, and very sharp.

The tail is rounded and nearly equals the trunk in length: its verticillations are composed, above, of large tubercles, and below, of flat, quadrangular scales.

Colour.—Black-brown above, passing into pale brown on the lower parts. Head uniform in colour. The neck and back present rusty red spots, sprinkled with yellowish or whitish points. Belly washed with yellow on a brown ground. The black-brown of the back shows itself also on the tail, which is annulated with reddish.

Locality.—Mexico, where there is an erroneous but general belief that the bite of this species is fatal.



Heloderma horridum.

Here, according to promise, we proceed to give some account of the *Lacertidæ*, as far as our space will permit.

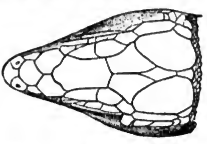
The *Lacertinidæ*, in Mr. J. E. Gray's arrangement, come immediately after the *Teidæ*, and are followed by the *Zonuridæ*.

Mr. Gray's *Lacertinidæ* consist of the genera *Zootoca*, *Lacerta*, *Teira*, *Eremias*, *Acanthodactylus*, *Scapteira*, *Meroles*, *Mesalina*, *Calrita*, *Algira*, *Psammodromus*, *Ophiops*, and *Calosaura*.

We must here confine ourselves to the genera *Lacerta* and *Zootoca* as examples.

Lacerta. Linn.

Generic Character.—Throat with a distinct collar. Nostrils situated towards the outer and inferior margin of the nasal scuta. An osseous superorbital lamina. Temples covered with scuta. Scales of the back, orbiculo-polygonal, slightly carinated. Palate toothed. (Bell.)



Head of Lacerta, seen from above. (Bell.)

Mr. Bell remarks, that the external parts from which the artificial characters of the present group are founded are principally the plates covering the head, as above delineated, common to the whole subfamily *Lacertina*, the scales of the collar, the præ-anal scale, those in which the femoral pores are placed, the abdominal plates, and those of the back and tail. The abdomen is covered by broad plates applied to each other at the margins, and arranged in longitudinal rows. There is a distinct collar of overlaying scales longer than those which cover the throat and detached from those which cover the breast. Scales of the back and sides small and imbricated. Those of the tail arranged in distinct and even whorls, elongated and narrow, and becoming more so towards the end of the tail. Femoral pores.

Some account of the teeth of this group will be found in the article SAURIANS. Mr. Bell observes, that in addition to the teeth which are placed in the margins of the upper and lower jaws, there are also a few very minute ones on the back part of the palate, which may be readily felt by a pin or the point of a penknife. He further remarks that the existence or absence of these palatine teeth would perhaps scarcely be admissible alone as a generic distinction: but when combined with others, and associated also with a marked difference of habit, it may be admitted as a valuable, because it is a tangible and permanent character; and he has accordingly employed it as one of the means of generic distinction between the two English Lizards.

Example, *Lacerta agilis*.

Great confusion has existed touching the identity of this beautiful English species, arising from the application of the term *agilis* by naturalists to the common lizard of their several countries. This has not escaped the acute observation of the Prince of Canino and Musignano, whose searching diligence and well-employed experience have given him a knowledge of the *Vertebrata* of Europe surpassed by no living zoologist. He first cleared away the mists that hung over this species; and in his *Fauna Italica* clearly defined the true *Lacerta agilis*, or *Lacerta di Linneo*.

Mr. Bell, in his elegant work on *British Reptiles*, follows out the inquiry with great learning and industry, and as his authority on the subject of English Reptiles stands as high as that of the Prince with reference to European *Reptilia* generally, we shall take our descriptions from his pen.

Description.—Mr. Bell describes this species as varying exceedingly in colour and marking. 'The most common colour of the upper parts is a sandy-brown, with obscure longitudinal fasciæ of a darker brown, and a lateral series of black rounded spots, each marked with a yellowish white dot or line in the centre. There is often in this most common variety more or less of green on the sides.

'Another variety is that to which I have before alluded, in which the upper parts are more or less of a green hue. In some this colour is brighter and lighter than in others, but the usual colour is a rather dull brownish-green. Not only is it very probable that the passages which I have quoted from Linnæus and Müller indicate this variety, but I cannot help believing that all the accounts we have on record of the supposed occurrence of the Green Lizard, L. *viridis*, in Ireland and in England, are to be referred to individuals of the same variety of our present species, which were probably of unusually vivid hues, and observed under all the advantages of a bright sunshine. Such must doubtless be the explanation of the "beautiful green *Lacertæ*" seen by Gilbert White "on the sunny bank near Farnham." The Prince of Musignano, in his *Fauna Italica*, figures a variety with the whole of the back of a dull black-red colour. The under side is usually of a whitish or greyish colour, varied with light green towards the sides, about the collar, and under the tail, and with black dots scattered about those parts.

'In its general form this lizard is much thicker and less gracile than the more common species. The head is rather more obtuse, the body more rounded, and the limbs stronger and shorter. The relative proportions of the tail and the body vary exceedingly in different individuals. As a general rule, it may be stated that the length of the head and body together is to that of the tail as three to four nearly: but in one specimen in my collection the proportions are nearly equal; and in that which is figured above (p. 28 of Mr. Bell's work) the tail is even considerably shorter than the head and body, but this may have occurred from the mutilation and reproduction of the part. The legs are so short, that when the posterior ones are brought forwards, and the anterior placed backwards parallel to the sides of the body, the hinder toes do not extend farther than to the wrist of the anterior ones: in which respect it differs remarkably from the other species. In this, as in others, however, the abdomen of the female is proportionally larger than that of the male. The third and fourth toe of the fore-foot are nearly of equal length. Mr. Jenyns says the former is the longer, but in some specimens the reverse is the case. The plates of the head are similar in their general form and proportions to those of most others of the genus. The nostrils are placed near the outer or inferior margin of the nasal plates, and nearly half-way between the anterior and posterior margins. The frontal plate is elongate pentagonal; the anterior angle obtuse; the lateral margins parallel, but slightly contracted about the middle; the interparietal pentagonal, and with a depressed point in the centre; the occipital very small. The upper eyelid with a series of very minute scales, and the whole surface of the lower covered by similar ones; the space between the eye and the auditory passage covered with plates, of which the two superior, lying immediately under the parietal, are much the largest. The scales of the upper parts of the body are round or polygonal, and slightly, though distinctly, carinated. The abdominal plates in six rows, the middle series narrower than the adjoining ones. Præ-anal plate single, of a broad pentagonal form; the anterior margin bordered by four pairs of plates. Femoral pores varying in number from eight to fifteen on each side. In the specimen figured at page 28, there are eight on one side and nine on the other. The pores are in this species placed in flat triangular scales, whilst in *Zootoca vivipara* the scales are so round and small as almost to form tubes. The tail is covered with numerous distinct whorls, according to Dugès, from fifty to eighty, of elongated scales, which are longer, narrower, and more distinctly carinated towards the extremity. The number of whorls varies considerably in different individuals.' Total length of one of moderate size, 7 inches 2 lines.

Locality and Habits.—North of Europe, as high as Sweden and Denmark; rare so far south as Italy. Common in the north of France and Central Europe. England, near Poole.

Mr. Bell states that *L. agilis* is more timid, and far less easily rendered familiar, than the beautiful green lizard (*L. viridis*) of Guernsey and the south of Europe. 'The latter species,' says Mr. Bell, 'may be readily tamed, and taught to come to the hand for its food, and to drink from the hollow of the palm of any one to whom it is accustomed. It will lie coiled up between the two hands, enjoying the warmth, and not offering to escape. But it is very different with the present species, which appears not to be susceptible of any such attachment. It will indeed attempt to bite any one who handles it, which I have never known to occur with the *L. viridis*. When in confinement it ceases to feed, conceals itself with extreme timidity when approached, and ultimately pines and dies.'

ne number of eggs laid by the female is from twelve urteen, in hollows excavated by her for a nest. She rs them with sand, and leaves them to the rays of the

Mr. Bell is of opinion that the eggs are deposited a iderable time before they are hatched. He does not k that this species ever brings forth its young alive.

Lacerta agilis.

Zootoca. Wagl.

Generic Character.—Nostrils, collar, superorbital lamina, n the genus *Lacerta*. Temples covered with adpressed les. Scales of the back elongated and hexagonal. ate toothless. (Bell.)

Description.—Smaller and more slender than *L. agilis*, h the head more depressed, rather narrower, and the zzle sharper. Plates of the head, in size and arrangement, without much difference, with the exception of those the temples, which are smaller and more numerous in *otoca* than in *L. agilis*. Collar of nine plates, nearly nal; six rows of abdominal plates, the middle and outer es narrower than the intermediate. Dorsal scales rower, more angular, and with a less distinct carina n in *L. agilis*; but the caudal scales nearly similar. et more slender, and toes longer in proportion. Femoral res nine or ten generally, placed in scales, which differ ch from the corresponding ones in *L. agilis*.

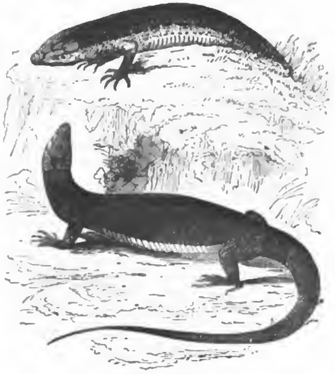
The colour and markings vary considerably. The upper ts are generally greenish-brown, and a dark brown line, unfrequently interrupted, runs down the middle of the ck. Parallel with this there is on each side a broad nd from behind the eyes to a greater or less distance wn the tail. Between these and the central streak one more rows of black dots are often seen, and in some h dots are found in the broad side-streak itself. The le has the under side of the body and base of his tail ght orange, spotted with black: in the female those ts and the tail are spotless greyish-green. Total length nerally from five inches and a half to six inches and a lf.

Locality and Habits.—'This agile and pretty little eature,' says Mr. Bell, 'is the common inhabitant of most all our heaths and banks in most of the districts of ngland, and extending even into Scotland: it is also one the few reptiles found in Ireland. On the Continent range does not appear to be very extensive: it is not und in Italy, nor, I believe, in France, and is very probably confined in a great measure to our own latitude. s movements are beautiful, gracile, as well as rapid: it mes out of its hiding-place during the warm parts of the y, from the early spring till autumn has far advanced, sking in the sun, and turning its head with a sudden otion the instant that an insect comes within its view, d, darting like lightning upon its prey, it seizes it with s little sharp teeth and speedily swallows it. Thus will often take a great number of the smaller insects, referring those of the dipterous order, though it will not efuse many of the coleoptera or orthoptera, if they be not o large.

'Instead of depositing her eggs in the sand to be hatched y the warmth of the sun, as is the case with the former, the female of the present species retains the eggs within the oviduct until the young are ready to leave them, and they are produced alive. As in all the ovo-viviparous reptiles, the covering of the egg is very thin, and merely membranous. In this respect they differ from those which deposit their eggs before the embryo is formed. In the latter case a more efficient protection is necessary, and the covering is either calcareous, as in the tortoises and crocodiles, or of a substance resembling parchment, as those of the snakes and most lizards. In the viper, which also produces its young alive, the covering, as in the present animal, is extremely thin, and very easily torn; and there is reason to believe that the laceration of this membrane and the emancipation of the young take place in, and are occasioned by, the very act of parturition.

'As the young ones are occasionally found with the mother, there is some reason to believe that these little animals are not wholly devoid of the instinct of parental care and tendance; but it is scarcely probable that the exercise of this feeling is ever very powerful, or that it endures for any considerable period. The young when brought forth are fully formed, and capable of running about, and, very shortly afterwards, of taking their own food. The usual number is from three to six.

'Although I have alluded to the sun's influence as being the means of hastening the evolution of the embryo in the oviparous reptiles, it is not to be concluded that the same source of warmth is unnecessary in the present and similar instances. The only difference is, that in the ovo-viviparous species the solar heat is communicated to the embryo through the medium of the mother; and hence we often see the pregnant female about the month of June constantly basking in the sun, and lying in such a position as to expose the body most fully to its influence. Every one who has watched the habits of our native reptiles, must have seen the same circumstance in the gravid female of the Common Viper; and may have observed how much more reluctantly and tardily she leaves the genial spot than the male.'



Zootoca vivipara.

The following preparations in the *Physiological Series* of the Museum of the College of Surgeons are illustrative of the organization of *Lacerta agilis*:—Nos. 445, 655, 2210, 2212, 2213, 2214, 2215, 2216, 2218, 2219, 2220, 2223, 2431, 3348, 3349, 3350.

FOSSIL VARANIDÆ?

Many of the extinct carnivorous Saurians, such as GEOSAURUS, MEGALOSAURUS, MOSASAURUS, and others, come so near in many points of their organization to the *Varanidæ* now in existence, that it almost becomes a question whether they might not be classed as belonging to that family. Indeed MM. Duméril and Bibron arrange them without a query under the title of *Fossil Varanians.* We should however remember, that great undoubtedly as the resemblance is, in the teeth especially, between those fossils and the living Varans, there are other and crocodilian elements in the organization of the former, which make it hardly justifiable to include those antient terrestrial and aquatic dragons under the family *Varanidæ.*

Here may be, perhaps, most aptly placed, with the reservation however above alluded to, Professor Owen's *Raphiosaurus.*

This new genus was introduced in a paper read before the Geological Society of London, and published in the sixth volume of the Transactions of that Society with the following title: '*Description of the Vertebral Column of a small Lacertine Saurian from the Chalk.*'

The specimen consisted of a chain of small vertebræ in their natural relative position. The bodies of these vertebræ are united by ball-and-socket joints, the socket being on the anterior, and the ball on the posterior part of the vertebra; and they were proved to belong to the Saurian class of Reptiles by the presence of many long and slender ribs, and by the conversion of two vertebræ through the length and strength of their transverse processes into a sacrum. Remains of an ischium and pubis were connected with the left side of the sacrum, proving that the reptile had hinder extremities as well developed as they are in the generality of Saurians: no trace however of either anterior or posterior extremities nor of head existed. The specimen is in the rich collection of Sir Philip de Malpas Grey Egerton, Bart.

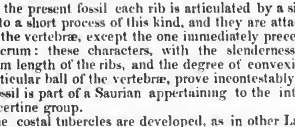
'With this evidence of the primary group of reptiles to which the fossil belongs, there next remained to be determined,' says Professor Owen, 'to which division of Saurians having ball-and-socket vertebral joints it was to be referred. In the Crocodilian or Loricate group the transverse costigerous processes are elongated, the posterior ribs are exclusively attached to these processes, and three, four, or five of the vertebræ which precede the sacrum are ribless, and consequently reckoned as lumbar vertebræ: in the Lacertine Saurians there are never more than two lumbar vertebræ, and all the ribs are supported on short convex processes or tubercles.

'In the present fossil each rib is articulated by a single head to a short process of this kind, and they are attached to all the vertebræ, except the one immediately preceding the sacrum: these characters, with the slenderness and uniform length of the ribs, and the degree of convexity in the articular ball of the vertebræ, prove incontestably that the fossil is part of a Saurian appertaining to the inferior or Lacertine group.

'The costal tubercles are developed, as in other Lacertians, from the sides of the anterior part of the body of the vertebræ; the under surface of the vertebra is smooth, concave in the axis of the body, and convex transversely.

'As there are twenty-one costal vertebræ anterior to the sacrum, including the single lumbar, the fossil cannot be referred to the genera *Stellio, Agama, Leiolepis, Lyriocephalus, Basiliscus, Anolis,* or *Chamæleon;* but a comparison may be instituted between it and the Monitors, Iguanas, and Scinks. In the absence of cranium, teeth, and extremities, any closer approximation of the fossil to existing forms would be hazardous, and too conjectural to yield any good scientific results.'

Professor Owen then observes, that if the portions of the lower jaw of a Lacertian from the lower chalk near Cambridge should be of the same species, as it agrees in size with that above described from the same formation in Kent, there would then be no doubt that the chalk Lacertian is generically distinct from any known existing lizard. It contains twenty-two close-set awl-shaped teeth, anchylosed by their bases to an outer alveolar parapet of bone.



Side-view of portion of lower jaw of Lacertian reptile from the lower chalk near Cambridge.

VARA'NUS. [MONITORS; VARANIDÆ.]

VARCHI. [SEGNI.]

VARCHI, BENEDETTO, born at Florence in [illegible] sent by his father, who was an advocate, to Pisa to [illegible] law; but at his father's death he gave up the [illegible] which he had no taste, and applied himself wholly to [illegible]rature. At the time of the fall of the Florentine rep[illegible] Varchi, who belonged to the losing party, emigr[illegible] Padua and Bologna, where he became intimate with Be[illegible] and other learned men. Some years after, Cosmo I. [illegible] firmly established on the ducal throne of Florence, re[illegible] Varchi, and appointed him one of the directors of [illegible] new Florentine Academy, which he instituted for the [illegible]pose of cultivating the Tuscan language and illustr[illegible] its standard writers. The academy frittered away [illegible] time in pedantic and interminable disputes about [illegible] words, but it brought forth also some useful works, [illegible] which was the 'Ercolano' of Varchi, a disquisition, [illegible] form of dialogue, on language in general, and more [illegible]ticularly on the Tuscan language. Varchi main[illegible] that the Tuscan or Italian language, which he, through [illegible] excess of nationality, calls Florentine, was suited to [illegible] branch of literature and to every style of writing [illegible] capable of expressing all kinds of sentiments and [illegible]tions, however varied. This he laboured to prove by [illegible]lations from the Latin. He published translations [illegible] Seneca, 'De Beneficiis,' and of Boethius, 'De Consolat[illegible] He wrote commentaries on Dante and Petrarch, and [illegible] sonnets and other short poems. But the principa[illegible] duction of Varchi is the 'Storia Fiorentina,' from the [illegible] 1527 to 1538, an important period, which embrace[illegible] last struggle and fall of the republic, the tyranni[illegible] dissolute rule of Alessandro de' Medici, which ende[illegible] his assassination, the elevation of Cosmo to the [illegible] throne, and the subsequent inroad of Filippo [illegible] his band of malcontents, which ended in the [illegible] Montemurlo and the death of the leaders. Varchi [illegible] it at the desire of Cosmo, and he has been charged [illegible] partiality towards his patron. This partiality howe[illegible] probably a matter of feeling and habit, and not [illegible] affectation. Besides, Duke Cosmo was certainly [illegible] superior man. Placed when a mere youth in a very [illegible] position, and in times of universal corruption, he [illegible] himself stern and even cruel towards his enemies [illegible] he effected also much good, and strove to heal [illegible] the wounds inflicted by the wars, revolutions, anarchy [illegible] misgovernment of nearly half a century. That his [illegible] character has been represented as worse than [illegible] by the reports of his enemies, is an opinion entertain[illegible] several reflecting and dispassionate writers. Varchi[illegible]rative is very diffuse, and his language abounds [illegible]pular Florentine forms of speech, which are perhaps [illegible] colloquial for the gravity of history. His work was [illegible] published for a long time after his death; yet pa[illegible] transpired in his lifetime, and drew upon him the [illegible]geance of powerful persons whom he had exposed. [illegible] night he was attacked and stabbed in several parts [illegible] body. He however recovered, and although the [illegible] parties remained unknown or unpunished, Duke Co[illegible] endeavoured to compensate him for the injury he had [illegible]ceived by making him a gift of his pretty country [illegible] called 'La Topaja,' and of the clerical benefice of M[illegible]varchi. Pope Paul III. invited him to Rome, but Var[illegible] declined the offer. He died of apoplexy in 1565.

Not many years since a small critical work of Var[illegible] was discovered in MS. in the Magliabecchi Library [illegible] Florence, and published under the title of 'Errori di Pa[illegible] Giovio nella Storia,' Florence, 1821.

(Corniani, *I Secoli della Letteratura Italiana*; Ti[illegible]boschi, *Storia della Letteratura Italiana*.)

VARE'NIUS, BERNHARDUS, author of a treati[illegible] systematic geography, of which Newton, when Lucas[illegible] professor of mathematics at Cambridge, published [illegible] edition for the use of his students, was a native of [illegible] in the territory of Lüneburg, now part of the kingdom [illegible] Hanover. The materials for a Life of Varenius are [illegible]ably meagre. Nothing appears to be known of his [illegible] parentage, the time of his birth, or the events of his [illegible]hood. The library of the British Museum contains a [illegible] of a Thesis on Aristotle's definition of motion, printed [illegible] Hamburg in 1642, which Varenius undertakes to defe[illegible] on the 16th of November, in a public disputation under the presidency of his tutor Joachim Junge, rector and pr[illegible] ssor of physics and (pro tempore) of logic in the gym- asium of Hamburg. The thesis is dedicated to Albert on Eitzen, burgomaster of Hamburg; Conrad Meyer, chdeacon of Celle; Jodocus Capelle, preacher in the t. Catherine's Church at Hamburg; and Ernst Schele, easurer to the duke of Lüneburg and Brunswick. The ithor calls his thesis ‘Musarum Philosophicarum Pri- itiæ.’ The library of the British Museum also contains copy of a medical thesis ‘De Febri in genere,’ printed Leyden in 1649, which ‘Bernhardus Varenius, Ultza- naæburgensis,’ undertakes to maintain in public dis- itation on the 22nd of June as part of his trials previous receiving the degree of doctor of medicine. This ‘in- igural thesis’ is dedicated by the author to the burgo- asters and senators of Lüneburg. Varenius's ‘Description Japan’ was published at Amsterdam in 1649; it is dicated to the burgomasters and senators of Hamburg, id the date of the dedication is Amsterdam, the calends st) of July, about a week after he had taken his degree. e assigns as the reason for dedicating his book to the iagistrates of Hamburg, his having learned the first ele- ients of philosophy, mathematics, and physics in the ymnasium of that city. In the preface addressed to the ader he mentions that after he had finished his medical idies he was for a time deterred from entering upon prac- e by the small prospect he had of obtaining employ- ent; and that in this state of mind he had devoted him- lf to the study of philosophy and the mathematical iences. During this interval he had composed a treatise ‘Conic Sections,’ but had been unable to find a pub- her for a work so remote from popular interest. At last opening had presented itself for entering into medical actice, offering only a slender prospect of remuneration at st, but on the other hand ample opportunities of acquiring actical knowledge. He had resolved, he proceeds, to nbrace this opportunity, and to restrict his inquiries in ture to medicine, and to geometry and physics, which esteemed important auxiliary studies. He thus leaves to be inferred that the publication of his account of apan, which he describes as an amusement of his leisure ours, an attempt to present in a systematic form and in ne Latin language a compendious view of the informa- on respecting that empire contained in Dutch and Por- iguese authors, was his farewell to general literature. he ‘Systematic Geography’ (‘Geographia Generalis’) of arenius was originally published at Amsterdam, in 1650. the dedication of this work to the senators of Amsterdam, e author alludes to his account of Japan, published the ar before, and states as his reason for dedicating the ok to them, that he had found in their city an asylum id the means of pursuing his studies when obliged to fly om his native country, laid waste by the ravages of war. e intimates his intention, if the Geography is favourably ceived, to follow it up by a work on the food and drink various nations, and on the different kinds of medicines use among them. These incidental notices in the dedi- tions and prefaces of the works we have mentioned pear to establish the identity of their author, and supply faint outline of his history from 1642 to 1650. Of the bsequent history of Varenius we have found no trace, cept that Chalmers asserts, on what authority we have en unable to discover, that he died in 1660. Jöcher entions a Henricus Varenius, a native of Hervord in estphalia, who was at one time chaplain to Duke ugustus of Brunswick-Lüneburg, and died pastor and perintendent of the church at Ulzen in 1636: this may ve been a relation (father?) of Bernhardus Varenius. ie description of Japan (‘Descriptio Regni Japoniæ’) is, has been noticed above, a mere compilation. It was e last of a series of similar monographs of actually isting states published by the Elzevirs. Prefixed is a ssertation on what constitutes a state; a list of the states to which the world was divided at the time of publica- on; and a catalogue of the authorities consulted for the count of Japan. An appendix contains a notice of the airi of Japan, and some information respecting Siam and ersia. Annexed is an account of the religion of the ipanese, and a narrative of the introduction into and sup- ession of Christianity in Japan, dedicated to Christina, ieen of Sweden. Lastly, there is a short view of all reli- ons. The ‘Geographia Generalis’ is divided into three ooks. The author treats in the first and second of general or universal geography; in the third, of special or particular geography. The contents of the first book he calls ‘Absolute Geography,’ including under this designation all that relates to the form, dimensions, or motion of the world, the general properties of the land, the seas, rivers, &c. The second book is devoted to what he terms ‘Relative Geography,’ and in this is comprehended everything relating to climates, seasons, the difference of apparent time at different places, the lengths of days in different latitudes, temperature, &c. In the third book, ‘Comparative Geography’ (by which Varenius means the relative positions of places), after some remarks upon the longitude, the construction of globes and maps, measurements of distances, and the sensible and visible horizons, six chapters are devoted to an exposition of the theory and practice of navigation. The work is the first attempt at a system of physical geography: it is characterised by precision, good arrangement, and lucid expression. The author has evidently had extensive acquirements in mathematics, and wider and more scientific views in natural history than prevailed for well nigh a century after his book was published. Newton's editions of the ‘Geographia Generalis’ (1672 and 1681) contain important improvements in the mathematical theory and corrections of the tables of latitudes and longitudes. Jurin, a fellow of Trinity College, Cambridge, at the suggestion of Bentley, published a new edition with an appendix, containing the most recent discoveries, in 1712. An English translation of Jurin's edition by Dugdale, revised by Shaw, was published in London the second edition of this translation is dated 1736. The contents of Jurin's appendix are introduced into the body of the work; and the geographical nomenclature and positions are adapted to the best English maps. A French translation from this English edition, by Depuisieux, was published at Paris in 1755. The publication of Varenius's ‘Geographia Generalis’ marks an epoch in the history of geography.

(Varenius, *De Definitione motus Aristotelica*, Hamburgi, 1642; *De Febri in genere*, Lugduni Batavorum, 1649; *Descriptio Regni Japoniæ*, Amstelodaemi, 1649; *Geographia Generalis*, Cantabrigiæ, 1681; *Id. Angl.*, by Dugdale, London, 1736; *Id. Gall.*, par Depuisieux, Paris, 1755; *Philosophical Transactions*, vol. vii.; Eloy, *Dictionnaire Historique de la Médicine*; Jöcher, *Allgemeines Gelehrten Lexicon*; Chalmers's *Biographical Dictionary*; *Biographie Universelle*.)

VARESE. [COMO.]

VARGAS, LUIS DE, a distinguished Spanish painter of the sixteenth century, born at Seville in 1502. He was the first who established a correct and grand style of design in oil and in fresco painting in Andalucia, where, until his time, the Gothic taste prevailed generally. He exhibited a disposition to excel in design at a very early age, and his natural taste disapproving of the style of the artists of his own country, he determined upon visiting Italy and studying the works of the great masters of that country. He accordingly, in 1527, went to Rome, and is said to have become a scholar of Perino del Vaga, the beauties of whose style and of the Roman school he fully mastered. Vargas remained twenty-eight years in Italy: his first known work in Seville is dated 1555. Cean Bermudez contradicts the account of Palomino about Vargas' returning to Seville after a seven years' sojourn at Rome, and finding himself inferior to Antonio Flores (or rather Francisco Frutet, as Bermudez says) and Pedro de Campaña, returning for another seven years to Italy; and he points out other inaccuracies in Palomino's notice of this painter, for example, the compliment paid to Vargas' picture in the cathedral, called La Gamba, by Perez di Alessio, at the expense of his own St. Christopher, which is an anachronism, as the St. Christopher was not painted until 1584, sixteen years after the death of Vargas, who died in 1568, and not 1590, as is stated by Palomino. Vargas established a greater reputation at Seville than any painter that preceded him, and he executed many excellent works there in oil and in fresco, which deservedly rank him with the first painters of Italy. His design was correct in outline and grand in style; his foreshortenings were admirable, and in this respect he is unrivalled in Spain; and had his works been as conspicuous for tone and harmony of colouring, as they were for brilliancy, composition, character, and expression, Vargas, says Bermudez, would have been the first among Spanish painters. His principal works, which are all religious, are at Seville,—in the Cathedral; in the Hospital de Santa Marta; in Santa Cruz; in Santa Maria la Blanca; in the Merced Calzada; in the Hospital de la Sangre; and in the Casa de la Misericordia. Some of these works are nearly totally decayed; others have been badly restored: in the last-mentioned place is a fresco of the Last Judgment. Vargas is described as having been a very amiable man, but he was of a melancholy and superstitious turn of mind: he was in the habit of chastising himself, and used to lie in a coffin some hours a-day meditating upon death.

(Bermudez, *Diccionario Historico*, &c.)

VARI, Buffon's name for the *Lemur Macaco* of Linnæus.

This Macauco is white spotted with black, so that the whole of the fur of the body is variegated with large black and white patches. The furry hair of the cheeks is very long, whence it has been also called the Ruffed Lemur.

Locality.—Madagascar, where it is said to be common.

Food; Habits.—Fruits form the only nourishment of this beautiful and elegant creature. In captivity it is mild and endearing in its manners. One which was kept for some time in the menagerie of the Zoological Society in the Regent's Park was disposed to be very familiar. Anxious to be noticed, it endeavoured to attract the attention of visitors, and would even attempt to arrest them as they passed with its little hands, that they might gratify it by caressing it or bestowing a little fruit upon it.

VARIABLE. A quantity is said to vary when it changes value, whether gradually, or by jumps or starts. The notion of a variable quantity is the first which must be established in teaching the Differential Calculus, and requires a little explanation.

One magnitude at least is hardly conceivable without the notion of variation; we mean time or duration. Reckoning from a fixed epoch, the idea of *the present time* is nothing but that of the other extremity of a variable quantity, the variation of which we cannot suspend, even in thought. Again, in space-magnitudes, though we are not obliged to consider them as formed by variation, yet it is in our power to do so, and we are constantly learning the variation of length, area, or solidity consequent upon motion. And we can even consider this variation as arising from no act of our own, as independent of us, and out of our power to stop: though even when this is physically true, namely, that the variation is out of our power, we can conceive or imagine that it does stop, and trace the consequences of such stoppage. Variable *magnitude*, then, presents natural ideas, such as we not only easily acquire, but such as it would be difficult, if not impossible, to suppose that we could help acquiring.

But when we come to speak of *number*, the case is much altered. The constant phrase of an algebraist, 'let x be a variable quantity,' clear as it may be where quantity means magnitude, is not quite so plain when quantity means number as the representative of magnitude. There is something to be said as to how number is imagined to vary at all: and still more as to its *gradual* variation.

Number is an abstraction of the mind; it is not magnitude, but a mode of reference of one magnitude to another. If we might dare to say it, number is more of the nature of an opinion about magnitude than of magnitude itself. When we speak of a symbol representing a variable number, we know that, though we say the symbol changes its values, it is we ourselves who arbitrarily change the meaning of the symbol. We can imagine (waiving all question about the possibility of our imagination, or its metaphysical truth) everything annihilated except two material points, one or both of which are in motion with respect to the other: but we cannot in such a case imagine x to be a symbol of a variable number. Unless some intellect be in existence to mean something by x, or to make a symbol of x, there can be no such thing as a variable number, or as the abstract idea of number at all. When we say, let x be a variable number, we must always be understood to mean, let x be a symbol which at one time we may be allowed to make to stand for one number, and at another time for another.

Now as to *gradual* variation. A point never changes its distance from another by, say a foot, without making every assignable lesser change in the interval. Or, a line which is lengthened from AB to AC by the motion of a point, must at some period of the change be equal to AD, if AD be anything between AB and AC. At least it is a necessary condition of *our* existence to believe this to be as evident as that two straight lines cannot inclose a space, though [SPACE AND TIME] we believe some would be found to deny it. But in the case of number, we cannot form anything but an approximation to this idea of gradual variation. We can pass from 1 to 2 by successive steps, by millions of millions of steps if we please: that is, h representing a small fraction, we can proceed from 1 to 2 by the steps $1 + h$, $1 + 2h$, $1 + 3h$, &c., in such manner that we shall not arrive at 2 till a million of million of steps have been made. But this is not gradual variation, such as is in our ideas when we think of a line increasing in length by the recession of one extremity from the other. Nor, if we subdivide our steps ever so far, can we, in consequence, cease to make steps; that is, we cannot imagine gradual variation of number. When therefore we talk of x standing for a number, which is also to represent the number of units in a variable length, we can only mean that our numerical progression can be made, if we please, by steps so small, that whatever length AD may represent, the lines representatives of some or other of the numerical steps by which we pass from the number in AB to the number in AC, may be made as near to AD as we please. It is, no doubt, in this essential distinction between the ideas involved in the variation of number and in that of magnitude, that the existence of INCOMMENSURABLE quantities takes its rise.

The first steps of the Differential Calculus are often embarrassed by a mode of speaking, which appears as if two different symbols were used for the same thing. 'Thus,' it is said, 'let x be a variable, and y a function of that variable, such that y is always $= x^2$. Then let x be changed into $x + h$, in consequence of which y becomes $y + k$, so that $y + k = (x + h)^2$.' Now if x be the symbol of the *variable* quantity, which can only mean this, that both before the quantity has changed, and after, it is represented by x, how can it be allowed both to let x, as it were, imply its own variation in its very meaning, and yet alter x into $x + h$ to denote that x changes? The truth is, the language is incorrect: it should be as follows:—let there be two variable quantities, one of which is always the square of the other; let x be the value first given to one of the variables, and y to the other, so that $y = x^2$. Then let a new value $x + h$ be given to the first variable, in consequence of which the second becomes $y + k$, so that $y + k = (x + h)^2$. In fact, x does not represent a variable quantity, but a certain value given to a variable quantity.

VARIATION. Under this head comes the explanation of a part of the language of proportion which is misused, and which was once very prominent in English mathematical writings. We refer to such phrases as the following:—A varies as B—A varies inversely as B—the gravitation of particles varies inversely as the square of their distances—the time of oscillation of a pendulum varies as the square root of its length, &c.

When we say that one thing varies as another, we mean that there are two variable magnitudes, which have the property, that if when the first changes from A to B the second changes from a to b, then A is to B in the same proportion as a to b. And when we say that one thing varies inversely as another, we mean that if when the first changes from A to B, the second changes from a to b, then—

$$\mathrm{A} : \mathrm{B} :: \frac{1}{a} : \frac{1}{b} \text{ or } :: b : a.$$

The modes of denoting these laws of connection used to be, in English works—

$$\mathrm{A} \propto a \qquad\qquad \mathrm{A} \propto \frac{1}{a}.$$

These were in fact but modes of writing the equations

$$\mathrm{A} = ca \qquad\qquad \mathrm{A} = \frac{c}{a}$$

in a manner which should recognise their existence without obliging us to think of the particular value of the constant c. According to the preceding equations, if we take the first, and suppose that A changes into B when a changes o b, we see obviously that $A \div B$ is the same as $a \div b$, h being equal to c. And $A \propto a$ informs us that $\div a$ is always the same quantity, without saying what s.

Vhen one quantity varies as both of two others jointly, neans that if either of the second and third mentioned nain constant, the first varies as the other. Thus the ce of a quantity of goods varies jointly as the number of ngs and the price of each. At a given price per article, whole price varies as the number of things; for a en number of things, the whole price varies as the price one. When x varies as y and z jointly, the equation $= cyz$ is implied.

Ve are rather inclined to regret the complete disappear- ce of the notation of variations which has taken place thin the last few years, though the phraseology is still some degree of use. It is now usual either to write uations at full length, or to make an equation of the riation itself, which can always be done by a proper oice of units. Thus $A \propto a$, or $A = ca$, can always be ade $A = a$, if such choice of units be made in which to easure the magnitudes A and a as will make $c = 1$. is must be done by contriving that A and a shall be- me unity together. But this, however convenient for re calculation, is likely enough to produce confusion in mind of the learner, and actually does so in many stances. It is obvious enough that of two different gnitudes one may *vary as* the other: thus the height of barometer (a length) varies as the pressure of the mosphere on a given surface (a weight). But it is as vious that one magnitude cannot be *equal to* another, less the two be of the same kind. When therefore a iter on mechanics, with little or no previous explana- n about the units employed, states that the *weight* of a dy is its *mass* multiplied by the *force of* gravity, or that e *pressure* on a mass is equal to the *mass* multiplied by *acceleration*, he writes effectively only for a reader who ows the subject already. The weight of a body varies intly as its mass and the acceleration which the force of avity would create in one second. Alter either of these lone, and the weight is altered in the same proportion. lence if w, m, g be the numbers of units of their several inds in the weight, the mass and the acceleration caused y gravity, the equation $w = cmg$ must subsist where c is numerical constant depending on the units employed. ' the weight which is called 10 (pounds, ounces, or hatever they may be), belong to the mass called 5, when ted on by such gravity as produces an acceleration of 4 eet, yards, or whatever the unit of length may be) in the me called 1 (second, minute, or other unit of time), then $) = c \times 5 \times 4$, or $c = \frac{1}{2}$. As long as the same units of ngth, time, mass, and weight are employed, the equation $= \frac{1}{2}mg$ must subsist: change the units, and the constant must have another value, to be again determined from instance. When the writer above mentioned says that $= mg$, he means, or ought to mean, that it is an agree- ent between him and his reader that whatever mass may called 1, and whatever may be meant by 1 of length d 1 of time, the weight which is called 1 shall be that of e mass 1 acted on by the force of gravity 1. The older riters, who used variations, needed no specifications of is kind, since the actual concretes themselves were the bjects of reasoning, and the variation asserted was true th of the concrete magnitudes and of any system units which they might adopt. The introduction of eir units was naturally and easily made; and when riations became equations, the student could not help eing the introduction of all conditions depending on the ode of measurement. In dropping the notation of varia- ons, our writers passed into that want of distinct ex- lanations of primary terms which was the characteristic many of the French writers.

The beginner must carefully bear in mind that one uantity does not vary *as* another, because it varies *with* at other. A square and its root vary together, but the quare does not vary *as* its root: if, for instance, the root e doubled, the square is not doubled, but quadrupled.

It is however most important to remember that when wo quantities vary together, the increment of the one aries as the increment of the other very nearly, if both he increments be small, and the more nearly the smaller hey are. Thus, if we know that when x has a certain value, the addition of ·01 to x gives an addition of ·001 to its logarithm, we may be sure that the addition of $\cdot 01 \times h$ to x will give an addition of $\cdot 001 \times h$ to the logarithm, very nearly, as long as $\cdot 01 \times h$ is small.

VARIATION OF THE COMPASS (OR OF THE NEEDLE), frequently now called the declination of the needle, is the angle which a vertical plane passing through the axis of a magnetised needle makes with the geographical meridian of a ship or station; and as, for the purposes of navigation, the needle is made to traverse horizontally, the variation becomes the angle between the magnetic axis of the needle and a meridian line passing parallel to the horizon through the centre of the compass.

When the variation of the needle was first distinctly ascertained in London, by Norman and Burroughs, in the year 1580, it was found that the magnetic axis deviated from a true meridian line as much as 11° 15′, its north point being directed so far towards the east; and in a few years from that time it was discovered that the angle of deviation was slowly diminishing. In the year 1657 the needle appeared to lie in the direction of the geographical meridian of London; and from that time to the year 1820 the northern extremity of the needle continued to advance towards the west. A mean of the observations between the years 1814 and 1820 shows that the deviation was then about 24° 18′; and at present, in London, it appears to be diminishing, the observations made since 1838 indicating a variation amounting to less than 24°. Like deviations of the magnetised needle have been observed in other parts of the world, and the following table will show the amount and rate at stations where the variations have been observed during a series of years:—

Tornea.

Date.		Variation.
1695	Bilberg	7° 0′ W.
1736	Maupertuis	5 5 W.
1767	Hellant	8 50 W.
1777	Hellant	11 45 W.
1825		12 7 W.

Mean annual movement westward 2′ 24″.

London.

1580	Norman	11° 15′ E.
1622	Gunter	6 12 E.
1634	Gillebrand	4 5 E.
1657	Bond	0 0
1672	Halley	2 30 W.
1723	Graham	14 17 W.
1773	Heberden	21 9 W.
1790	Gilpin	23 19 W.
1804	Gilpin	24 8·4 W.
1813	Colonel Beaufoy	24 22·17 W.
1815	Colonel Beaufoy	24 27·18 W.
1820		24 11·7 W.
1823		24 9·8 W.

Mean annual movement westward 8′ 52″.

Paris.

1541	Bellarmatus	7° 0′ E.
1580	Sennertus	11 30 E.
1660	Petit	1 0 W.
1700	Cassini	7 40 W.
1750		17 15 W.
1800	Cotte	22 12 W.
1819		22 29 W.
1829		22 12 W.

Mean annual movement westward 8′ 6″.

Copenhagen.

1649	Luchtemacher	1° 30′ E.
1672	Bartholin	3 35 W.
1730	Lous (Senior)	10 37 W.
1770	Lous (Senior)	15 32 W.
1782	Bugge	17 41 W.
1806	Wleugel	18 25 W.
1817	Wleugel	18 0 W.

Mean annual movement westward 6′ 58″.

Stockholm.

1718	Elvius	5° 37′ W.
1771	Wilcke	13 4 W.
1800	Wilcke	16 20 W.
1817	Cronstrand	15 34 W.

Mean annual movement westward 7′ 48″.

St. Petersburg.

Date.		Variation.
1726	Mayer	3° 15′ W.
1782	Euler	7 30 W.
1812		7 16 W.
1818		7 27·5 W.

Mean annual movement westward 2′ 45″.

Tobolsk.

1716	Stralenberg	0° 0′
1761	Chappe	3 46 E.
1805	Schubert	7 9 E.
1828	Hansteen	9 53 E.

Mean annual movement eastward 5′ 18″.

Petropaulowska.

1779	Cook	6° 19′ E.
1805	Krusenstern	5 20 E.

Mean annual movement westward 2′ 18.″

Cambridge, U. S.

1708	Brattle	9° 0′ W.
1763	Winthorp	7 0 W.
1783	Williams	6 52 W.

Mean annual movement eastward 1′ 42″.

Gibraltar.

1733	Butler	13° 38′ W.
1761	Ross	17 11 W.
1792	Marchand	22 6 W.

Mean annual movement westward 8′ 36.″

Rome.

1670	Auzout	2° 15′ W.
1730	Cassini	11 0 W.
1788		17 12 W.

Mean annual movement westward 7′ 36″.

Constantinople.

1600		0° 0′
1625	Fournier	2 0 W.
1694	Chazelles	10 30 W.
1797		12 33 W.

Mean annual movement westward 3′ 54″.

St. Helena.

1677	Halley	0° 40′ E.
1775	Cook	12 18 W.
1806	Krusenstern	17 18 W.
1836	King and Fitzroy	18 0 W.

Mean annual movement westward 7′ 0″.

Table Bay, Cape of Good Hope.

1614	Daunton	1° 45′ W.
1667		7 15 W.
1699		11 0 W.
1708		14 0 W.
1721	Mathews	16 25 W.
1791	Vancouver	25 40 W.
1813		28 0 W.

Mean annual movement westward 7′ 55″.

Bombay.

1676		12° 0′ W.
1723	Mathews	5 10 W.
1791	Marchand	0 0

Mean annual movement eastward 6′ 16″.

Canton.

1690	Fontenay	2° 25′ W.
1817	Yeates	0 0

Mean annual movement eastward 1′ 8″.

Otaheite.

1765	Byron	5° 0′ E.
1769	Cook	4 46 E.
1777	Cook	5 34 E.
1792	Vancouver	6 12 E.
1823	Duperrey	6 40 E.
1826	Beechey	7 33 E.
1836	Fitzroy	7 34 E.
1840	Belcher	6 30 E.

Mean annual movement eastward 1′ 36″.

Ascension Island.

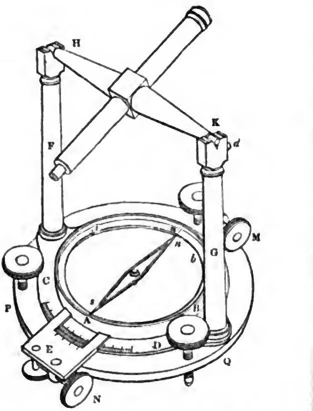
1678		1° 0′ E.
1754	La Caille	8 6 W.
1775	Cook	10 52 W.
1806	Bönsöe	15 40 W.
1835		22 4 W.

Mean annual movement westward 9′ 6″.

It appears from the above table that, in general, the annual variation of the needle is greater at places nearly on the meridian of London than at those which lie eastward or westward of that meridian: but for the hypotheses on which it has been attempted to account for the phenomena, the reader is referred to TERRESTRIAL MAGNETISM, p. 239. In the same article there is also given (p. 2[illegible]) a cut, representing in both hemispheres the isogonal lines, or those on which the variations of the needle are the same; and as it may be useful to know the precise amount of that element at the places on the earth's surface where it has most recently been observed, the following table is subjoined:—

Place.	Year.	Variation.	Observer.
Abo	1825	11° 20′ W.	
Acapulco	1838	8 23 E.	Capt. Belcher.
Alexandria (Egypt)	1822	10 58 W.	
Amboyna	1823	0 28 E.	
Archangel	1824	2 7 E.	
Ascension Island	1835	22 4 W.	
Bahia		4 18 W.	
Batavia	1814	0 17 E.	
Berlin	1836	17 5 W.	Enke.
Brest	1818	25 7 W.	
Brussels	1832	22 19 W.	Quetelet.
Callao (Castle)	1838	10 0 E.	Capt. Belcher.
Cape Comorin	1815	2 9 E.	
Cape Town	1813	28 0 W.	
Corfu	1818	14 34 W.	
Funchal (Madeira)	1829	21 32 W.	
Hammerfest	1827	10 14 W.	Sir E. Parry.
Havannah	1816	5 30 E.	
Hobart Town	1836	11 6 E.	Capt. Fitzroy.
Irkutsk	1830	1 25 E.	Fuss.
Jamaica (Port Royal)	1817	4 40 E.	
Juan Fernandez	1802	14 0 E.	
Kasan	1820	2 22 E.	Hansteen.
Leghorn	1818	19 20 W.	
London	1838	24 0 W.	Ross.
Martinique (Fort Royal)	1816	6 45 E.	
Mauritius	1824	13 46 W.	
Minorca (Cape Mola)	1811	19 30 W.	
Monte Video	1807	13 20 E.	
Montreal	1834	7 30 W.	
Moscow	1828	3 2 W.	Hansteen and Erman.
New Zealand {S. lat. 35° 16′ long. 174°}	1836	14 0 E.	Capt. Fitzroy.
Oahu Island {N. lat. 21° 17′ long. 202°}	1837	10 39·5 E.	Capt. Belcher.
Otaheite	1840	6 30 E.	Capt. Belcher.
Panama	1837	7 37 E.	Capt. Belcher.
Paris	1835	22 4 W.	
Pekin	1829	1 48 W.	
Petropaulowsk	1829	4 6 E.	
Pointe de Galle (Ceylon)	1814	2 15 E.	
Porto Bello	1815	6 0 E.	
St. Helena	1836	18 0 W.	Captains King and Fitzroy.
St. Thomas	1836	2 24 E.	
Sidney	1836	10 24 E.	Capt. Fitzroy.
Spitzbergen	1823	25 12 W.	Col. Sabine.
Stockholm	1833	14 57 W.	Rudberg.
Tobolsk	1828	9·53·5 E.	Hansteen and Erman.
Toulon	1811	19° 10′ W.	
Valparaiso	1821	14 43 E.	
York Fort	1819	6 0·3 E.	

The instrument with which the variation of the needle is observed is, when considerable accuracy in the determination is attempted, very similar to a common theodolite. The needle *n s* is usually nine or ten inches long, and is supported upon a conical pivot of steel, which enters into an agate cap at the centre of gravity of the needle. The compass box A B is either circular or rectangular; and if the former, on a metal ring *a b*, forming part of its circumference, are drawn two lines, one of which appears at *n*, in the direction of a diameter; so that when the needle is placed on its pivot, its extremities, which are pointed, can be made to coincide with these lines. The box is capable of being turned in azimuth upon a plate C D, part of whose circumference is graduated; and an index with a



ernier on a frame E, which projects from the compass-ox and turns with it, serves to show the value of the va-iation. On this plate are two pillars F, G, supporting a elescope which turns in a vertical plane on a horizontal xis H K, in every respect like a transit instrument; and he plate with the telescope is capable of a small movement n azimuth by the screw M, for the purpose of adjustment, hile it rests on the wooden or metallic base P Q of the nstrument.

If the compass-box is rectangular, the plate on which it ests and also the base of the instrument, have a like figure; and in this case one of the sides only of the plate s graduated: this side is then in the form of a circular rc.

The optical axis of the transit telescope is by the artist isposed as nearly as possible vertically above that dia-neter of the compass-box which is in the direction of the wo lines above mentioned; and in adjusting the instru-nent for use, the base of the instrument having been levelled y means of three foot-screws, the index of the vernier t E must be brought to the zero of the graduations: the ransit telescope being then provided temporarily with an dditional object-glass, in order that it may be adapted to he view of a near object (its horizontal axis H K having een previously levelled), it must be turned on that axis owards each of the two lines, and the intersection of the ires in its field must be made to coincide with them by neans of a screw at *d* near one extremity of the axis. The elescope must then be placed in the plane of the meri-ian by any of the usual methods: for example, the wires n its field of view may be made to bisect any circum-olar star at the computed instant of its culmination; and n adjusting-screw N fixed to the base of the instrument rves to turn the plate carrying the compass-box through small angle for this purpose.

The diameter passing through the line at *m* on the rim of e compass-box is now in the direction of the geographical eridian of the station; and the needle being at rest in e direction which it assumes in consequence of the action terrestrial magnetism, the compass-box must be turned azimuth till the extremities of the needle are seen to co-cide with the line at *m* and with that which is opposite to , when the index of the vernier at E will point to the va-ation, or declination, which it was required to observe.

An instrument similar to that which has been described n of course only be used on land. At sea the compass-ox is suspended within a ring, a horizontal pivot at each ctremity of a diameter of the box resting in a correspond-g perforation made through the ring; and at each ex-ernity of a diameter of the latter, at right angles to that hich passes through the perforations, is a horizontal pivot rning in a perforation made through a vertical arm at the upper part of the stand of the instrument. By this contrivance the pivot which supports the needle is enabled to keep a vertical position notwithstanding the motion of the ship, while the compass-box with the ring is capable of being turned round on the vertical axis of the stand. To the top of the box is fixed an alidade, or bar, of brass, carrying two plain sights, which are to be directed to the sun or star at the instant that an observer with a sextant takes the altitude of the celestial body: the angle contained between the alidade and the needle of the compass is the observed azimuth, or bearing of the celestial body from the direction of the magnetic meridian; and the difference between this angle and the computed azimuth [AZIMUTH] is the required variation of the needle.

The variation is also found, at sea, by observing the sun's amplitude at the time of rising or setting; the sights of the compass being for this purpose directed to the celestial body at the moment that its centre appears in the horizon; and the angle between the alidade and the east or west line of the compass being read on the card, the difference between this angle and the amplitude computed by spherical trigonometry will be the variation of the needle. This method is however less accurate than that of an azimuth, because of the uncertainty of the refraction in the horizon. In order to neutralize the local attractions on the needle of a ship's compass, Mr. Barlow's correcting plate is now generally employed. [SAILING.]

Besides the general or secular variation which has been mentioned, it was observed in 1722 that the needle is subject to diurnal changes of position [DECLINATION OF THE MAGNETIC NEEDLE]; and from the experiments of Mr. Graham it would appear that then the extent of this change was between 35′ and 55′, but it is now believed that either of these numbers is much too high. Mr. Canton observed in 1756, that the daily variations were greater in summer than in winter, being in June 13′ 21″, and in January 7′ 8″; and from experiments carried on by Colonel Beaufoy, between the years 1813 and 1819, it was found that, from June to August, a mean of the diurnal variations amounted to 11′ 8″, while in December it was 4′ 7″. The cause of the phenomenon is still uncertain, but it is scarcely possible to doubt that the sun is the chief agent in producing it, either by partially heating the surface of the earth, or, according to Biot, by an electro-magnetic quality in the rays of light.

In 1823, Messrs. Barlow and Christie, at Woolwich, having, by means of magnets properly disposed, neutralized the action of terrestrial magnetism on their needles, so as to leave the latter free to be acted upon by that which is the cause of the diurnal variation, succeeded in making this variation much more sensible than it is when the needles are in the ordinary state. On observing the effects produced, it was found that, at about 5 A.M., the needle coincided in direction with the magnetic meridian, and that its northern extremity declined gradually towards the east till about 7½ A.M., when the greatest easterly deviation seemed to be attained; from this time the deviation diminished, the northern extremity of the needle moving westward, and about 11 A.M. the needle was again in the magnetic meridian: the westward movement continued till about 1½ P.M., when the deviation in this direction became the greatest, and then it gradually diminished, the northern extremity of the needle moving eastward. At 5 P.M. the diurnal variation again became zero, or the needle once more lay in the direction of the magnetic meridian; and the eastward movement continued till late in the evening. That these effects may arise from a diminution of the force of terrestrial magnetism by the heat of the sun, is probable from experiments which were made by Mr. Canton, and more recently by Mr. Barlow; the latter gentleman, having neutralized the general action of the earth on a suspended needle, placed about the latter four bar-magnets in directions parallel to the needle and to the magnetic meridian, two of them being in line on each side: he then observed that, while all the magnets were of equal temperature, they produced no movement in the needle; but on heating—first, the two eastern bars equally,—then, in succession, the south-eastern bar only, the two southern bars together, the south-western bar only, the two western bars together, and so on—the needle remained in the direction of the magnetic meridian, or deviated from it, in a manner exactly analogous to the effects produced apparently by the sun when, from the position of the latter with respect to the magnetic meridian, he may be supposed to heat the parts of the earth which correspond to the positions of the heated bars. It is evident that the diurnal variation vanishes both when the sun is in the plane of the magnetic meridian (about 11 A.M. and 11 P.M., in this part of the world), and when he is in a vertical plane at right angles to that meridian: in the first case the rays of the sun act nearly equally on the eastern and western sides of the needle; and in the other they act nearly equally on its northern and southern arms, and consequently they can exert no power to produce deviation. In any of the intermediate situations of the sun, the heat excited in the part of the earth which is nearest to the luminary, by diminishing the force of magnetism in that part, allows the nearest extremity of the needle to recede from the sun, and thus gives rise to a temporary deviation of the former from the plane of the magnetic meridian.

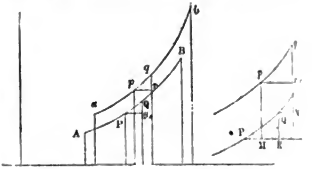
The instrument for observing the diurnal variations is a needle suspended at its centre of gravity by means of a silk fibre which is free from twist, the needle being balanced so as to hang in a horizontal position. It is contained in a box which is made of wood, in order to avoid any attraction which may be produced by metal, and with glass sides for the admission of light. A micrometer-microscope in a vertical position is partly introduced in the case immediately above each end of the needle; and the case having a motion in azimuth by means of a screw, the microscopes can be made to follow the small movement of the needle which is caused by the diurnal variation: within the case a circular arc opposite each extremity of the needle is graduated; and by means of the micrometers the value of the diurnal variation may be read, a line on the needle at each of its extremities serving as an index. The value of the variation is read on both arcs in order to avoid the errors arising from any excentricity of the needle, and a mean of the two readings is considered as the correct value.

Near the equator the diurnal variation is small, probably because the sun's heat is there always nearly of the same intensity; and it is found to increase in proceeding from thence northward or southward. In Sumatra the needle attains its greatest eastern deviation about 5 P.M., and its greatest western deviation at 7 A.M. In Europe and North America, the greatest eastern deviation takes place between 7 and 8 A.M., and the greatest western deviation between 1 and 2 P.M; and in Greenland, the greatest eastern deviation is about 9 or 10 A.M., and the greatest western deviation from 8 to 10 P.M.

VARIATION OF THE MOON. [MOON.]

VARIATIONS, CALCULUS OF. The preceding words might seem fit to include every organized mode of dealing with the variations of value which algebraical quantities are made to receive; the differential calculus, for example: but they have a technical meaning, which we proceed to explain. When a quantity is subject to one sort of variation only, the consideration of that variation belongs to the simple differential calculus: but when it is subject to two or more distinct sorts of variation, suppose that of the differential calculus and another, then the mode of dealing with the second sort of variation is said to belong to the calculus of variations. In dynamics, for example [VIRTUAL VELOCITIES], there are two distinct species of motion to consider: one which, at the end of the time t, the system is about to take during the ensuing time dt in consequence of the velocities acquired by its particles; and another which, without any consideration of the first, must be impressed upon it for the examination of the conditions which express the equivalence of the impressed and effective forces. Here then is a case for the calculus of variations.

Suppose a curve AB, with which is connected another, *ab*, infinitely near to the first, and related to it by a given law, in such manner that any point P being given on the first, a corresponding point p can be found on the second. If the coordinates of P be x and y, and those of Q (infinitely near to P) be $x + dx$ and $y + dy$, and if we signify the coordinates of p by $x + \delta x$ and $y + \delta y$, we have two distinct notations, one for the increments which the coordinates receive in passing from point to point of the first curve, the other for those which they receive in passing from a point in the first curve to the corresponding point in the second. Hence, PR being dx, and pr what d becomes after *variation*, we have $\delta(dx) = pr - \mathrm{P}$



which is obviously equal to QN − PM. But PM is δ and QN is what δx becomes when x is changed $x + dx$, whence QN − PM $= d(\delta x)$; or $\delta dx = d\delta x$, and the same may be proved for y. We shall now recapitulate the results of the further application of this method. It quite beyond our limits to attempt to prove them; so that referring to works on the differential calculus for further information, we shall content ourselves with some remarks on the loose manner in which this calculus is nearly always applied to questions of maxima and minima, and to a very few words of its history.

1. The operations of differentiation and variation are interchangeable in order, as in $\delta dx = d\delta x$, $\delta\int \mathrm{V}dx =$ $\int \delta(\mathrm{V}dx)$, &c.

2. If y be a function of x, and if y', y'', &c. stand for the successive differential coefficients of y with respect to x, the successive differential coefficients of $\delta y - y'\delta x$ are $\delta y' - y''\delta x$, $\delta y'' - y'''\delta x$, $\delta y''' - y^{\mathrm{iv}}\delta x$, &c.

3. If V be a function of x, y, y', y'', &c., and if $\int \mathrm{V}dx$ taken from $x = x_0$ to $x = x_1$ be required, and if y_0, y'_0, y''_0, &c. and y_1, y'_1, y''_1, &c. be the values of y, y', y'', &c. when $x = x_0$ and $x = x_1$: and if moreover $\omega = \delta y -$ $y'\delta x$, which becomes ω_0 and ω_1 at the two limits. Let the differential coefficients of V with respect to x, y, y', y'', &c., separately, made variable be X, Y, P, Q, &c., and let the complete differentiations of the with respect to x be denoted by accentuations, and their limiting values by subscript ciphers and units as before: then we shall have for $\delta\int \mathrm{V}dx$ the following formula:—

$$
\begin{aligned}
&\mathrm{V}_1\,\delta x_1 - \mathrm{V}_0\delta x_0 \\
&+ (\mathrm{P}_1 - \mathrm{Q}'_1 + \mathrm{R}''_1 - \&c.)\,\omega_1 - \bigl(\mathrm{P}_0 - \mathrm{Q}'_0 + \mathrm{R}''_0 - \&c. \\
&+ (\mathrm{Q}_1 - \mathrm{R}'_1 + \mathrm{S}''_1 - \&c.)\,\omega'_1 - \bigl(\mathrm{Q}_0 - \mathrm{R}'_0 + \mathrm{S}''_0 - \&c. \\
&+ (\mathrm{R}_1 - \mathrm{S}'_1 + \mathrm{T}''_1 - \&c.)\,\omega''_1 - \bigl(\mathrm{R}_0 - \mathrm{S}'_0 + \mathrm{T}''_0 - \&c. \\
&+ \;.\;.\;.\;.\;.\;.\;.\;.\;.\;.\;.\;.\;.\;.\;.\;.\;.\;. \\
&+ \int_{x_0}^{x_1} (\mathrm{Y} - \mathrm{P}' + \mathrm{Q}'' - \mathrm{R}''' + \&c.)\,\omega dx.
\end{aligned}
$$

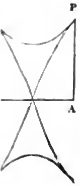
The most usual application of the preceding formula, its most general geometrical form, is as follows:—V being a given function of x, y, y', &c., it is required to draw curve such that $\int \mathrm{V}dx$ shall be the greatest possible or the least possible, provided that at one limit of integration x_0 and y_0 shall be coordinates of one given curve, and that at the other limit x_1 and y_1 shall be coordinates of another given curve. Such cases are when it is required to draw the shortest line between two given curves, or to find in what form and position a flexible curve of given length will rest when its ends are supposed to slide upon given curves. We have pointed out (*Differential Calculus*, Library of Useful Knowledge, c. XVI.) that the ordinary mode of treating these questions is not sufficiently general, and must in certain cases even lead to positive error. We intend here to enforce this conclusion by showing that even in more ordinary questions of maxima and minima the same want of generality may lead to the same sort of false conclusion.

A maximum, or greatest value, means one which is greater than any neighbouring value; so that when a function is at its maximum, any allowable slight change must be one of diminution. For greater read less, and for diminution increase, and we have the definition of a minimum. Now an ordinary question of maxima and minima as follows:—ϕx being a function of x, what are the real lues of x which make it a maximum or minimum? There a maximum when $x = a$, provided that $\phi\ (a + h)$ and $(a - h)$, when both are possible, are both less than ϕa: t if one of the two $\phi\ (a + h)$ and $\phi\ (a - h)$ be impossi- e, there is a maximum if *both values* of the other be less an ϕa. In all these cases it is supposed that h may be small as we please. Now

l. When $\phi\ (a + h)$ and $\phi\ (a - h)$ are both real, the theory plained in MAXIMA AND MINIMA is perfectly sufficient: ere is a maximum when $\phi' x$ changes from positive to gative in passing through $\phi' a$, and there is not a maxi- um in any other case.

2. When $\phi\ (a + h)$ is impossible, there is a maximum both values of $\phi' x$ be positive from $x = a - h$ up to $= a$: when $\phi\ (a - h)$ is impossible, there is a maximum both values of $\phi' x$ be negative from $x = a$ to $x = a + h$. It is the neglect of the second case which has led to the ersight in the calculus of variations which we shall pre- ntly mention. We shall now propose a case as follows: is required to find the maximum value of y in the equa- on.

$$y = (1 - x)^{\frac{3}{2}} + x^{\frac{3}{2}} = \phi\ x.$$



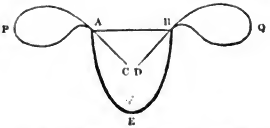
The form of the curve which has this equation is as in this diagram; O being the origin and OA (= AP) being unity. Now it ought certainly to be said that AP is the greatest ordinate of the curve, but neither is $\phi' x$ here equal to nothing, nor does it change sign. In fact when $x = 1$, we have $\phi x = 1$, $\phi' x = 1{\cdot}5$. The second criterion shows that AP is a maximum; the first shows nothing of the kind.

Now we can easily imagine it said, that in such a case as the preceding, AP, though unquestionably the greatest ordinate the curve can have, is not what is chnically called a maximum: but it is meant that the st term should be restricted solely to denote those values ϕx in which $\phi\ (x + h)$ and $\phi\ (x - h)$ are *both possible*, d both less than ϕx. To this, *ceteris paribus*, there uld be no objection: it often happens that the techni- l use made of a foreign term will not bear, and is not ant to bear, translation into our own language. The rd *maximum*, even in its widest allowable use, and if all ask for should be granted, will not answer to *greatest*: there may be several maxima and minima, and some the minima may be greater than some of the maxima, ich cannot be true of the words when translated. Suppose, n, that the word maximum is so restricted as to apply to value of ϕx except when $\phi\ (x + h)$ and $\phi\ (x - h)$ are h possible: the disadvantage will be twofold. First, in ry problem of maxima and minima, or in every problem ich is reducible to one of maxima and minima, we shall e to invent an additional term to signify, perhaps, the y greatest or very least value of the function. Secondly, in lying the same limitation to the calculus of variations, shall frequently be obliged to forego the solution of ich we are in search, unless we look for the very case, an answer to a problem of maxima and minima, to ich we have refused to apply the term maximum or nimum.

n order to make $\int V dx$, as before described, a maximum, generally presumed that $\delta \int V dx$ must $= 0$, and that y st be found in terms of x from this condition. Now the h is that $\int V dx$, after the variation, becomes $\int V dx +$ $V dx$, and all that is absolutely necessary is that $\delta \int V dx$ uld be always negative, for all values of δx and δy ween the limits, and for all values which are consistent h the limiting conditions, at the limits. It is easily wn that this requires, as to the indefinite integral part, following equation:—

$$Y - P' + Q'' - R''' + \ldots . = 0;$$

l if we are resolved not to consider any points of the iting curves, except those at which δx_0, δx_1, δy_0, δy_1, may either positive or negative, as we please, then it is easily proved that the rest of the expression for $\delta \int V dx$ must also vanish, and this limitation is generally made in works on the subject, by which means solutions are misstated and may even be lost sight of. Thus it is generally asserted that the shortest line between two curves is always a straight line which is perpendicular to the tangents of both; and that a flexible chain, allowed to slide between two curves, with an extremity on each, is in equilibrium when it is in the form of a catenary perpendicular to the retaining curves at the points of suspension. On this we need only direct attention to the accompanying figure. The shortest line that can be drawn between the curves APA and BQB



is AB, which is perpendicular to neither of the tangents AC, BD; and the flexible chain AEB will hang from the cusps A and B without the slightest tendency to become perpendicular to AC and BD at its extremities.

The fact is, that owing to the very great complexity of the mathematical part of the subject, the part of the calculus of variations which relates to the maxima and minima of integral forms is in a very incomplete state. There are no problems yet remaining to be solved which are of such high interest as to excite continual attention, and, until there are, little hope can be entertained of any decided progress. How long it will be before the mere vanishing of a differential or variation will cease to be taken as the conclusive evidence of a maximum or minimum, depends on the degree in which mathematics will be studied as a discipline, and not solely as an instrument of physical inquiry.

The history of a large part of the Calculus of Variations is simply that of dynamics from the time when D'Alembert proposed his celebrated principle (1743). But long before this, the questions of maxima and minima which ultimately came to occupy the greater part of professed works on the calculus of variations, took their rise in the researches of the two Bernoullis, and led to their celebrated quarrel. [BERNOULLI.] The first problem, namely, to find the curve of shortest descent between two given points, proposed by John Bernoulli, was quickly followed by others of the same kind, proposed by James Bernoulli, in which the curve to be found was required to be of a given length. The prevalence of problems in which this last condition was contained, led to the name of the solution of *isoperimetrical* problems, by which the calculus in question was long distinguished. But it must be noted that the first who solved any such problem as has since been referred to the calculus of variations, whatever may have been his method, was Newton, who in the Scholium to the 34th proposition of his second book gives, without demonstration, the construction requisite for finding the solid of least resistance. [PRINCIPIA, p. 9.] The subject was successively taken up by Brook Taylor, Euler, Simpson, Emerson, and Maclaurin, the second of whom first gave the general equation which determines the nature of the function required, independently of the limits of integration; and his 'Methodus inveniendi lineas curvas proprietate maximi minimive gaudentes,' published in 1744, being the last of his efforts on this subject which was made before Lagrange came into the field, is an epoch in its history. Lagrange's first change in existing methods was the introduction of the specific symbol δ to stand for the variation of x (which suggested to Euler the name of the *Calculus of Variations*) and of the formation of all that part of $\delta \int V dx$ which is free from the integral sign. Furnished with such an apparatus, he undertook problems of a much more complicated class than any of his predecessors, and stamped upon the subject the form which it has never since lost, at the same time that he gave it an extension which it can hardly be said to have since exceeded. Lagrange's memoirs were contained in the first and fourth volumes of the 'Miscellanea Tauri-

nensia,' published in 1760 and 1773. The 'Mécanique Analytique' of Lagrange (first edition, 1788) must also be regarded as the first work in which the calculus of variations was fully applied to problems of statics and dynamics, in the manner since universally followed. A complete and most excellent history of the rise and progress of the branch of this calculus which treats of the maxima and minima of undetermined integrals is contained in, and forms the substance of, Woodhouse's 'Treatise on Isoperimetrical Problems,' Cambridge, 1810.

VARICELLA, or *Varicella Lymphatica*, is the eruptive disease commonly called chicken-pox, and which has been described by different writers under the names of chrystalli, variolæ pusillæ, variolæ spuriæ, &c. It is almost peculiar to infants and young children; and the eruption appears either without premonitory signs, or after two or three days of slight illness. The eruption commences on the shoulders, neck, and breast: on the scalp and back it is usually abundant, but the face is only slightly affected. It consists of vesicles, about as large as a split-pea, full of transparent fluid, and lenticular, conoid, or globular in their form. They are surrounded by a slight superficial redness, and successive crops of them appear for two or three days, the old vesicles shrivelling up as the new ones are formed. Most of the vesicles burst naturally, and the cuticle which covered them falls to the level of the surrounding skin; but some shrink, the fluid within them becoming whey-like, or, if they be much irritated, purulent. After drying they form small scabs which fall off in grains, and sometimes leave small superficial scars. The whole course of the disease occupies about a week, and is not attended by any important constitutional disturbance. It therefore requires no particular treatment.

The first writers on varicella considered it as only a mild form of variola, or small-pox, and the same view is maintained by some modern authors, especially by Dr. Thomson of Edinburgh. It is however more probable that chicken-pox and small-pox are essentially different, on these grounds: 1, They sometimes prevail in distinct epidemics, no case of genuine small-pox occurring among many of chicken-pox. 2, The characters of the chicken-pox eruption are altogether different from those of small-pox even in its mildest and most modified form. 3, Chicken-pox is not inoculable, though the mildest small-pox is. 4, Chicken-pox is altogether unaffected by previous vaccination, and does not prevent the action of vaccine matter.

VARICOSE VEINS. [VEINS.]

VARIEGATION, or MARKING, in Botany, is applied to the disposition of two or more colours in the petals, leaves, and other parts of plants. The cause of the colour of plants is a subject involved in much obscurity, and neither the microscope nor chemical analysis has thrown much light upon it. The tissues of plants themselves are free from all colour, and they only become coloured from having deposited in their interior various secretions. The most prominent colour in the vegetable kingdom is green, the leaves of plants being generally of that colour. When the cellular tissue of a leaf is examined, the cells are found to contain a number of globules, consisting of starch and other substances; but the most abundant of these are those of a coloured secretion which, on account of its green colour, has been called chromule and chlorophyll. This is a carbonaceous substance, and it was supposed that the black carbon which it contains gave the green colour to the leaves; but it is not the colour of the carbon that produces greenness, as chlorophyll is found in leaves of very different colours, and also in the petals of flowers. Light has a great influence in developing the green colour of the chlorophyll, and it is well known that the leaves of plants become white in the dark, and that the parts of plants underground are seldom coloured. Sometimes the leaves of trees, when growing with perfect exposure to the light, become white in particular places, and they are then called variegated leaves. This circumstance occurs in all kinds of plants. In Exogens the blotches are for the most part irregular, but in Endogens they are usually arranged in bands that follow the course of the veins. The cause of this want of development of the colouring power of the chlorophyll is at present unknown. It is seldom confined to single leaves, but embraces the whole of the leaves of a branch. If a cutting is planted from a branch thus affected, the whole plant that is produced from it will have variegated leaves. It is thus that variegated laurels, hollies, and other shrubs are procured for the purpose of producing variety in gardens and plantations. This variegation of the leaves sometimes disappears, and it is found that it is best preserved when plants are placed in sterile soils, and soonest lost in fertile soils. It is not continued in plants grown from seeds. The cause of this singular phenomenon is not known. It is generally attributed to a diseased state of the tissues of plants; but from a microscopical examination of the affected tissues we have been able to detect no change of structure, nor does the general health of the tree appear at all affected.

At different periods of the year leaves undergo very obvious changes in the colour, more particularly in the autumn, when leaves assume various shades of red and yellow. These changes seem to arise from an obstruction in the function of the leaf previous to its death, as leaves assume the same colours at all seasons of the year when they are accidentally injured.

The colours of petals producing the variegations so much esteemed by florists, in such flowers as the tulip and the ranunculus, are exceedingly various. They may be divided into two great series: those having yellow for their type, which passes into red or white, but never into blue; and those which have blue for their type, and which are also capable of passing into red or white, but never into yellow. The first series is called, by De Candolle, Xanthic, and the last, Cyanic. Of these series Lindley gives the following analysis:—

Green colour of leaves.

Cyanic.	Xanthic.
Greenish blue	**Yellow-green**
Blue	**Yellow**
Violet-blue	**Orange-yellow**
Violet	**Orange**
Violet-red	**Orange-red**

Red.

It is found that a yellow flower may assume the colours of the Xanthic series, but never become blue, and *vice versâ*; and this rule applies to many genera. It is not however universal, as genera are occasionally found having both yellow and blue flowers, as Tropæolum and Hyacinthus. These various colours depend on secretions in the cellular tissue of the petals, but the nature of these secretions is not well understood: they closely resemble however, if they are not identical with, chlorophyll.

VARIETIES, in Botany, are groups of individual plants subordinate to species. The character of the species is found in its capability of reproducing by seed a plant which is more like itself than it is like anything else; and this under all circumstances in which the offspring is capable of being produced. The variety differs from the species in points of structure which are developed only under certain circumstances, and which are not essential to the species. This may be illustrated by an example, as for instance, the common apple (*Pyrus Malus*). If the seeds of the wild apple, or any of the cultivated varieties of apples, are sown under any circumstances, the plants that spring from these seeds will, in the great mass of their characters, be more like all other apple-trees than they will be like pear, plum, or any other trees. This then illustrates the idea of a species. If, on the other hand, the seeds of some of the sorts of apples known under the names of Golden Pippin, Nonpareil, &c., be sown under different circumstances from that in which the plant from which they are taken was grown, the plants produced will differ in many respects from their parents in the characters that constitute the variety, but not in those of the species. The characters on which the definition of a species is founded ought to be such that no circumstances can alter them; whilst the essence of a variety consists in its having characters which are altered and produced by circumstances. The external agents which produce varieties in plants are very numerous—as situation, temperature, light, air, moisture, dryness, elevation, and, above all, cultivation. [SPECIES OF PLANTS.] Early botanists were not aware of the remarkable influence these circumstances had on plants, and accordingly set down as species plants that differed in any remarkable manner as species. Linnæus was one of the first observers to detect this error, and having given his definition of his idea of a species i selected a definition for each particular species, he uced a great number of previous species to varieties. ; as a species can only be defined by its *permanent* racters, and as a group of individuals can only be called ariety by an ascertained want of permanency in their ential characters, time must elapse before it can be ermined with regard to many groups of individuals ether they are species or varieties. Thus although næus, proceeding on his own experience, reduced many the species of previous writers to the rank of varieties, subsequent observers have again regarded them as cies. But as we can have only a very imperfect know-ge of what are the permanent characters of the great k of plants that are growing in the world, the defi-ons of many species can only be an approach to cor-ness, and their excellence will depend more on the gment of the botanist than on any definition of the idea species. Still the great end of systematic botany must the determination of the true characters of species; and s only through the study of varieties that these can be lerstood. It is therefore as unphilosophical in botany reject the study of varieties as trifling, as it would be the same ground in chemistry to reject the study of the mic constitution of the elements of compound bodies.

In botanical works considerable difference exists in re-ding varieties and species. Thus Dr. Lindley, in his ynopsis of the British Flora,' gives descriptions of about 1[illegible]0 Phanerogamous plants; Sir William Hooker, in the t edition of the 'British Flora,' gives about 1500 species; ilst the list of the plants of the Edinburgh Botanical ciety, drawn up by Professor Balfour and Messrs. bington and Campbell, gives upwards of 1700 species. great difference also exists in recording varieties of mitted species. The attention given to varieties by itish botanists is small compared with that of many ntinental writers, especially in Germany, who in their orks record with great accuracy any departures from the rmal type.

The mode of recording varieties differs in different riters. In some cases the species is defined, and the escription is regarded as indicating one amongst the roups of varieties of which the species is composed. The reek alphabet is used frequently alone to express varie-es. Thus Hooker, in the 'British Flora,' page 233, gives e definition of *Rosa inodora*, and afterwards describes e varieties as β and γ, and they are always spoken of as rieties α, β, and γ of Rosa inodora, the character of the ecies constituting var. α. Many writers give an addi-nal name to the variety which is attached to that of the ecies. Thus the varieties of *Euphorbia lucida* are itten *Euphorbia lucida latifolia*, *E. l. salicifolia*, *E. l. arifolia*.

Where plants have undergone many changes by cultiva-on, further subdivisions are frequently resorted to: thus some writers *Brassica Rapa*, the common turnip, is scribed in two subspecies, *B. R. oleifera* and *B. R. pifera*; each of these has several varieties, as *B. R.* o. *ennis*, and *B. R. o. annua*, and *B. R. r. longa*, and *B. R. rotunda*. Each of these varieties has again been sub-vided, according to the colour of the roots, forming hite, yellow, green, and red subvarieties.

The natural varieties of plants are nothing like so nu-erous as those which arise from cultivation. Almost the tire object in view in the kitchen and fruit gardens is e developing of some property in plants which they do ot exhibit in their natural state, and this is mostly at-nded with a corresponding change of structure. All the arieties of apples are produced by cultivation from the ommon crab (*Pyrus Malus*), all the pears from *Pyrus mmunis;* the cherries from *Prunus Cerasus;* peaches, pricots, nectarines, from *Amygdalus Persica;* and plums om the *Prunus domestica*. The same is true of vege-bles: all the varieties of cabbages are produced by culti-ation from the same species; so also with turnips, potatoes, dishes, &c. This is also the case with flowers: the great ajority of tulips, roses, anemones, ranunculi, &c. found n gardens are the result of changed characters dependent n cultivation. Although many of the varieties of fruits, egetables, and flowers retain the same names for a great ength of time, there is nothing permanent in their charac-ers but those which belong to the species. It is for this eason that old varieties of fruits and flowers, which were known in gardens or orchards fifty years ago, are now seldom to be met with; the circumstances which have produced them no longer surround their posterity, and they revert to the original character of the species. The late Mr. Knight, president of the Horticultural Society, long since ascertained that the varieties of apples and pears have only a limited duration. In this way a valued variety known by the name of the Golden Pippin is generally wearing out. It may in some instances be propagated by grafting, but it quickly cankers and dies. Many persons are thus disappointed in the planting of orchards: if they grow seedlings of fine old varieties, they no longer bear the fruit of their parents; and if they employ grafts, the tree grows weakly, quickly cankers, or bears a very imperfect kind of fruit. The attempt, then, to keep up old varieties is almost useless, but the horticulturist has his resource in being able to produce new varieties, many of which equal and even excel older varieties; but these in their turn are destined to perish.

The varieties of particular species of flowers which are most valued are those which depend on a change of colour in the flower, or an increase in its petals, so that a single flower becomes double. But although this department of floriculture has had so much attention paid to it, little or nothing is known with regard to the circumstances which favour a change in the colour of flowers. With regard to annuals, none of the varieties can be certainly reproduced by seeds, and generally the best varieties of flowers are obtained from the seeds of individuals that have most closely resembled the species. In perennial and shrubby plants, varieties may be preserved, in the same manner as in fruit-trees, by continuing the individual variety by means of cuttings, offshoots, layers, buds, &c.

One great source of variety in plants is the production of seeds by plants belonging to different species. This can be easily effected by art between allied species, by taking the pollen of one species and applying it to the pistil of another; the consequence is, that plants produced by the seeds of the latter partake of the characters of both their parents. These plants, as animals produced in the same way, are called mules or hybrids. This circumstance does not often occur in nature, but still there are many instances on record, of very puzzling varieties of plants having been thus produced, and not a few new species owe their origin to this cause. But hybrid varieties are not more permanent than those produced by other means, as they are quite incapable of propagating their peculiarities by seed for more than two or three generations, and some of them are incapable of producing seed at all. This intermixture can only be made to take place between closely allied species. No one has ever succeeded in fertilizing the apple with the pear, or the gooseberry with the currant, or the cucumber with the melon, and *vice versâ*. As a probable source of variety in wild plants hybridization should never be overlooked; and in large genera, as Rosa and Rubus, where all the recorded species have a close identity of structure, great care should be taken not to admit varieties and species which may arise from this cause, as, being perishable in their nature, they only remain to confuse subsequent observers.

In obtaining varieties of plants for use or ornament, the production of hybrids is of great practical importance. 'I am inclined to believe,' says Professor Lindley, 'that the power of obtaining mule varieties by art is one of the most important means that man possesses of modifying the works of Nature, and of rendering them better adapted to his purposes. In our gardens, some of our most beautiful flowers have such an origin: as, for instance, the roses obtained between *R. indica* and *R. moschata*, the different mule Potentillæ and Cacti, the splendid Azaleas raised between *A. pontica* and *A. nudiflora coccinea*, and the magnificent American Indian Rhododendrons. By crossing varieties of the same species, the races of fruits and of culinary vegetables have been brought to a state as nearly approaching perfection as we can suppose possible. And if similar improvements have not taken place in a more important department, namely, the trees that afford us timber, experience fully warrants the belief that, if proper means were adopted, improved varieties of as much consequence might be introduced into our forests, as have already been created for our gardens. It is however to be regretted that those who occupy themselves with experi ments of this kind do not confine them to woody or perennial plants which can be perpetuated by cuttings. Mule annuals have the great fault of perishing almost as soon as they are obtained, and they serve no other purpose than that of encumbering the records of science with accounts of so-called species which from their transitory existence can never be re-examined.' (*Introd. to Bot.*, p. 349.)

VARIGNON, PIERRE. The common source of all biographies of Varignon is the éloge of him inserted by his friend Fontenelle in the Memoirs of the Academy of Sciences, and republished in the separate collection of éloges by the same author.

The subject of this article was born at Caen in 1654: his father, an architect, destined him for the church, and placed him at the college of his native town. He learned to make a sun-dial as well as his father's workmen could teach him, and this gave him a longing to know the principles on which such things are done, which he never found the way to gratify until, by accident, he met with a Euclid in a bookseller's shop. From this he went on to the writings of Des Cartes, much against the wishes of his friends, and became well versed in the mathematics of the day. Among his college friends was the Abbé de St. Pierre (not Bernardin, the author of the 'Studies of Nature,' but Charles), whose regard for Varignon induced him to make over to the latter 300 francs a year out of 1800 which was his patrimonial fortune. This was his sole provision for many years, and enabled him to pursue his studies: the two friends went to Paris in 1686, took up their quarters in the same house, and pursued their several researches. It was here that Fontenelle, who was also of Normandy, became acquainted with them, and he describes Varignon as the most laborious of students; glad to go on with what he was doing at two o'clock in the morning, under the pretext of its not being worth while to go to bed, because he usually rose at four. In 1687 his first work, the 'Projet d'une Nouvelle Mécanique,' brought him at once into such reputation, that he was in the following year elected to the Academy, and appointed professor of mathematics at the Collège Mazarin: in 1690 appeared the 'Nouvelles Conjectures sur la Pesanteur.' By 1705 he had ruined his health: he was for six months in danger, and for three years in a state of debility. His life is a purely literary one; and there is nothing more to say, except that he died in the night of December 22, 1722, without illness, having performed his usual duties at the college the day before.

We take his works from the 'Biographie Universelle:'—1, Paris, 1687, 'Projet d'une Nouvelle Mécanique,' 4to.; 2, Paris, 1690, 'Nouvelles Conjectures sur la Pesanteur,' 12mo.; 3, Paris, 1725, 'Nouvelle Mécanique,' 2 vols. 4to.; 4, Paris, 1725, 'Eclaircissements sur l'Analyse des Infiniment Petits,' 4to.; 5, Paris, 1725, 'Traité du Mouvement des Eaux Courantes,' 4to.; 6, Paris, 1732, 'Eléments de Mathématiques,' 4to.; 7, Geneva, 1730, 'Démonstration de la Possibilité de la Présence Réelle,' &c., in a collection of pieces on the real presence, by Vernet. There is perhaps no better test of real eminence than the desire of the surviving contemporaries to have an author's works; and more of Varignon was published after his death than he himself gave during his life. It is however to be remembered that, besides his two separate works, he printed a great deal in the Memoirs of the Academy of Sciences, particularly in defence of the new doctrines of the infinitesimal calculus. His name is familiar to all who have even glanced at the history of this theory as the explainer of its difficulties in answer to the earnest and frequently plausible attacks which were made upon it. The 'Eclaircissements,' &c. above mentioned, were intended by him as a commentary upon the well-known work of his friend De l'Hôpital, the first elementary writing upon the differential calculus. The 'Projet,' &c. was a most remarkable work, being in fact the first in which the great elementary principle of the composition of forces is made the basis of a systematic development of statics. Montucla mentions that Stevinus had preceded him in the knowledge of the use of this truth; insisting particularly upon his having used the most elegant and useful form of the theorem, namely, that forces which are as the sides of a triangle balance one another. Mr. Hallam ('Literature of Europe,' vol. ii., p. 462) cannot find this 'triangle of forces' in Stevinus. But the fact is that the theorem, though not perhaps separately enunciated by Stevinus, is used by him: for instance, in Albert Girard's edition of Stevinus, p. 44, column 2, a look at the second figure with the accompanying text will show that LDO and OFC are 'triangles of forces.' The merit of Varignon consists in his making the composition of forces a basis for everything, in which he has been followed by most writers since his time. Stevinus mixed different principles. Mr. Hallam remarks very naturally, 'Had it' (the triangle of forces) 'been known to him' (Stevinus), 'we may presume that he would have employed it, as is done in modern works on mechanics, in demonstrating the law of equilibrium on the inclined plane instead of his catenarian hypothesis.' So he would have done had he been reviewing the subject: but he was discovering it; and that very inverse order which so often takes place in discovery, and which brought out the binomial theorem as an ultimate result of a mode of finding the areas of certain curves, occurred in the case of Stevinus, who brought out the mode of using the triangle of forces rather than the theorem itself, from this very catenarian hypothesis; and, as far as we can see, partly by demonstration, partly by extension. One of the greatest compliments which Varignon's memory received was this, that his 'Projet,' &c. took such possession of the public mind, that by the time the work itself (3 in the above list) appeared, of which it was the 'Projet,' it excited very little notice, and added nothing to his fame.

The conjectures on the cause of gravity show that Varignon was not as happy in clear perception of hydrostatical laws as in those of statics. He imagines that the gravitation of a body towards the earth is the excess of the pressure downwards of the superincumbent column of air over the pressure upwards of the column between the earth and the body. This is enough for a specimen: even Fontenelle avows that he thinks it possible his friend may here have added one to the number of proofs of the difficulty of the subject. But notwithstanding this, Varignon may be placed among those men whose reputation is probably very much below their desert as estimated by their utility.

VARILLAS, ANTOINE, a native of Guéret, the capital of La Marche, was born in 1624. When he had completed his studies, he was sent to Paris as private tutor to some of his young townsmen. In 1648 he was appointed historiographer to Gaston, duke of Orleans. Dupuy procured for Varillas the situation of sublibrarian in the royal library, which he held under more than one of Dupuy's successors, and lost on account of his negligence in collating Brienne's MSS., which had been purchased by Colbert, with the originals in the library. He was allowed to retire with a pension of 1200 livres, which was withdrawn by Colbert in 1669. In the same year Varillas was offered a pension by the States-general of Holland to write the history of the United Provinces; but he declined the task, on the plea that he could not serve with his pen the enemies of France. In 1670 the archbishop of Paris obtained a pension from the assembly of the clergy for Varillas, whom he knew to be engaged on a history of heresies. Varillas died at Paris on the 9th of June, 1696. His published works are:—1, 'Politique de la Maison d'Autriche,' Paris, 1658, in 12mo; 2, 'Histoire de France,' Paris, 1683 et seq.; 14 vols. in 4to., or 28 in 12mo. The work contains the reigns of the kings of France from Louis XI. to Henri IV. 3, 'La Pratique de l'Education des Princes, ou l'Histoire de Guillaume de Crecy, seigneur de Chièvres;' Paris, 1684, in 12mo. 4, 'Les Anecdotes de Florence, ou l'Histoire Secrète de la Maison de Médicis;' La Haye, 1685, in 12mo. 5, 'Histoire des Révolutions arrivées en Europe en matière de Religion;' Paris, 1686-89, 6 vols. in 4to., or 12 in 12mo. This work extends from 1374 to 1569: a continuation to 1650, which would fill 12 quarto volumes, has remained in MS. 6, 'La Politique de Ferdinand le Catholique;' Amsterdam, 1688, 3 vols. in 12mo. A continuation of this work by the author exists in MS. The style of Varillas' writings is good for his age; but he has distorted facts and neglected to verify his quotations, and has even been convicted of alleging MS. authorities which never existed. Indolence and vanity seem to have been the chief if not the sole motives to his falsifications.

VARI'NAS, or rather BARI'NAS, as it is at present written in all official documents and modern publications a town in South America, in the republic of Venezuela, d the capital of the province which bears its name. It s near 7° 30′ N. lat. and 70° 12′ W. long., and is built, e many other towns in that part of Venezuela, at the se of the Andes, from which circumstance its importance mostly derived. This situation has made it the place here the inhabitants of two contiguous regions, which ffer greatly in their products, exchange their commodi-s. To the south-east of the town lie the plains known the name of Los Llanos, which extend to the banks of e Orinoco; and to the north-west are the lower declivi-s of the Andes, which gradually rise higher and termi-te in the Nevado de Mérida. The inhabitants of the ountains bring to the town the produce of their agri-lture, especially corn and fruit, and take in exchange e produce of the numerous herds of cattle which pas-re on the plains. The country which surrounds the wn is very fertile, and especially fit for the cultivation tobacco, which forms the staple article of its commerce, d is sent to Europe, where it continues to be in high re-ute, though the tobacco of Cumanacoa is said to be su-rior. This article is sent to Europe by way of Angos-ra in Guyana. The river St. Domingo, which originates the declivities of the Nevado de Mérida, and passes rough Barinas, becomes navigable at Toruno, about rteen miles below the town; so that the last-mentioned ace may be considered as the port of Barinas, from which exports are sent down the rivers St. Domingo, Apure, d Orinoco to Angostura. The population of Barinas fore the war of independence is said to have been 10,000 dividuals; but this place suffered much during the war, ving more than once been taken and retaken, and about n years ago a part of the population was carried off by a ntagious disease resembling the plague. At present its pulation is stated to be about 6000.

(Depons, *Voyage à la partie Orientale de la Terre-me*; Hall's *Colombia, its Present State*, &c.; and Co-azzi's *Resúmen de la Geografia de Venezuela*.)

VARINGHIANS, VAREGUES, VAREGO-RUSSES, name given by the first Russian chronicler, Nestor, to he Norman adventurers who gave the name of Russia to n empire founded by them from various Slavonian and innish populations.

It is remarkable that the origin of a name, bestowed at ce on an extensive country, inhabited by a great variety populations, and at a no earlier date than the ninth ntury, should have been for a long time matter of doubt d uncertainty to historians. Even recently Professor wers, of Dorpat, a man of great learning, who has id particular attention to this subject, declared that the aregues of Nestor were an Asiatic nation of Turkish race. is opinion was received by several historical writers. ther authors who treated the same subject ascribed a fferent origin to the Varegues.

The prevalent opinion however now is, that the Varegues re Normans, that is, Scandinavians. It is well known at the foreign troops levied by the Greek emperors ongst the Anglo-Saxons and Scandinavians were lled at Constantinople 'Varegues,' which signified allies ederati), according to the celebrated Norwegian an-list, Snorri Sturluson, who says that the Gothic troops ich served the Greek emperor had been called, since the ne of Constantine the Great, Varingar, from the old andinavian word *wara* or *waera* (*pactum*), 'alliance.' This s certainly a more courteous appellation than that of ercenaries, which more properly belongs to them. It is o very possible that the name of Varinghians was rived from the old Teutonic word '*werre*,' or '*warre*,' d simply signified 'warriors.' However, there is no ubt that the name of Varinghians was given by the zantines to several nations of North-western Europe who rved in the imperial guards, as those writers say that the aringhians were foreigners from Thule, a name which was plied by them sometimes to Scandinavia and sometimes the British Islands. Nestor states the same thing in the ost positive manner: he says, there are Varegues, Sweys wedes), Oormians (Norwegians), Anglanes (Angles), oths (inhabitants of the island of Gothland), and Russes. hese last Varegues puzzled the investigators of northern story; yet the researches of many of them seem to have tablished beyond all doubt that the appellation of Russ, Ross, was given to adventurers from Sweden. A part of the maritime coast of that country is still called Rosslagen; and the name of the Swedes in Finnish is Ruots, or Ross. It is therefore very natural that, as the Swedes became known to the Slavonians through the Finnish population, which lay between them and the Swedes, they should adopt the name given to the latter by the Finns. We have moreover two positive authorities that the Ross were Scandinavians. Luitprand, bishop of Cremona, who was at Constantinople in the tenth century, says, in describing an invasion of the Russians, 'Russios quos alio nomine Nordmannos vocamus' ('Russians, whom we also call Normans'). The Bertinian Chronicles relate that the Greek emperor Theophilus (in A.D. 839) sent an embassy to Louis the Debonnair, and with it some people who called themselves *Rhos*, and their king Chacanus, who had arrived at Constantinople in order to conclude a treaty with the Greeks. Theophilus requested Louis to give them some means for returning in safety to their own country, as they had arrived at Constantinople by passing through many ferocious nations, and he did not wish to expose them again to such dangers. The same people told Louis that they belonged to the Swedish nation. It is well known that several kings of Scandinavia bore the name of Hacon, which might easily have been corrupted into Chacanus; and the barbarous countries through which they had passed on their way from Sweden to Constantinople were probably the countries which lie between the Baltic and the Black seas. We may add that the emperor Constantine Porphyrogenitus, when describing, in his work 'De Administrando Imperio,' the cataracts of the Dnieper, gives the names of the principal of them in Slavonian and Russian. Though these names are corrupted, the Slavonian names may be easily made out; whilst the Russian are evidently Scandinavian words which answer to the meaning of the Slavonian appellations. The names of the Varego-Russo leaders who established the empire of Russia are evidently Scandinavian.

The establishment of the Varegues among the Slavonians was similar to that of their countrymen, the Normans, in France. Ruric, their chief, or 'konung,' having established his power at Novgorod and in the adjacent country, gave to it the name of Russia, like his countryman Rollo, from whose followers a French province assumed the name of Normandy; and it is very probable that if the successors of Rollo had extended their conquests over all France, the name of France would have been replaced by that of Normandy, in the same manner as the Slavonian countries subjugated by the descendants of Ruric received the appellation of Russia. Ruric gave different provinces and towns to his countrymen, who governed them as his vassals; and the descendants of the chief and of his companions, the number of which was increased by frequent new arrivals from Scandinavia, formed the class of princes and nobles. They soon adopted the language of the natives of the country, as was the case in France with the Normans; and the Scandinavian names, such as Oleg, Askold, Carl, and others, borne by the princes and chiefs, soon gave way to the Slavonian appellations of Vladimir, Sviatoslaf, &c. It seems also that the religion of Odin was abandoned by them for the Slavonian worship; for we see from Nestor that the Russian princes Oleg and Igor swore by Perun and Volos (Slavonian deities) in concluding treaties with the Greek emperors.

The introduction of Christianity by the Eastern Church and of the Liturgy in the Slavonian dialect, into which the Scriptures had been translated by Cyrillus and Methodius [SLAVONIANS], contributed to the obliteration of national differences between the ruling caste and the subject populations. The feudal institutions, which were uncongenial to the Slavonian spirit, soon disappeared; and the only traces of Norman character which remained for a considerable time in Russia, and particularly at Novgorod, were various legal provisions embodied in the code of Yaroslaf the Great (1019-1054): as, for instance, the fine for murders, wounds, &c., called *vira*, from the Teutonic wehrgeld, the judicial combat, and other kinds of ordeal, or trials by the judgment of God.

VARIOLA. [SMALL POX.]

VARIOLA'RIA, a genus of plants, belonging to the natural order Lichenes. This name is derived from *variolæ*, because the apothecia resemble the pustules of small-pox. The thallus of the plants belonging to this genus is crustaceous, membranaceous, adnate, spreading, uniform. The apothecium is a suborbicular, scutelliform cup, formed of the thallus, and filled with a powdery or flocculose substance which covers an immersed waxy disk containing imbedded thecæ. This genus borders closely upon others, and through some of its species it is closely connected with *Spiloma*, *Thelotrema*, *Parmelia*, *Urceolaria*, and *Isidium*. All the species were included by Linnæus in the species of *Lichen fagineus* and *L. lacteus*. They are of an ash-grey or white colour, and are found on the back of the trunks of various trees, on rocks, walls, or on the ground. About thirteen species are found in Great Britain.

V. faginea, the Bitter-zoned Variolaria, has an orbicular crust, surrounded by a zonate border of various colours: the apothecia are very abundant, convex, with an obsolete border, and filled with a snowy white powder. This is one of the species included in the *Lichen fagineus* of Linnæus. It is common on the bark of trees, especially of old beech-trees, and on pales. This species is distinguished from all others of the genus, as well as of the order, by its intensely bitter taste. It is for this reason that Turner and Borrer have separated the *V. discoidea* from this species, although it has only a very slight structural dissimilarity; but it has no bitter taste at all. Braconnot found that the *V. faginea*, as well as several other crustaceous lichens, contained oxalic acid. The quantity yielded by 100 parts of this plant was 29·4 of oxalic acid, combined with 18 of lime. This chemist further remarks, that the oxalate of lime bears the same relation in the class of cryptogamic plants that the carbonate of lime does to the lower classes of animals, and the phosphate of lime to the higher. The quantity of this salt however is not great in any of the lichens that are not crustaceous, although they are generally found to contain some other salt as a substitute. Sir William Hooker states that the *V. faginea* is at the present time employed in France, on a very extensive scale, for the purpose of obtaining oxalic acid. On what the bitter taste of this plant depends does not appear to have been at present ascertained; nor has it been used, on this account, in medicine. In tasting this lichen the bitter taste is not immediately perceived, and not until the lapse of some minutes is its intense bitterness developed.

V. lactea, Milky-white Variolaria, has a suborbicular, tartareous, thick, white, smooth, areolate crust, tinged at the edges with flesh-colour: the apothecia are copious, suborbicular, flattish, with an elevated border when young, which disappears with age; the powder very white. This is the *Lichen lacteus* of Linnæus. It occurs on rocks in mountainous countries. This is a very elegant species of the genus, and is one of the lichens that are collected for the purpose of being used in dyeing.

V. globulifera, Vesicle-fruited Variolaria, has an orbicular, thickish, glaucescent, rugose crust, and sprinkled all over with white soredia, and surrounded by a border somewhat zonate, and of various colours: the apothecia are large, spherical, depressed at the apex, where they at length burst irregularly, becoming scutelliform, with a lacerated border and a white powder. This species is found only rarely, growing on the bark of old oaks and beech-trees. It was gathered by Dr. Sibthorp in Greece; and, on account of the form of the reproductive organs, is the most remarkable-looking species of the genus.

V. Vitiligo, Leprous Variolaria, has an elliptical, very thin, almost filmy, whitish crust, with very numerous, minute, oblong, confluent apothecia, having a very narrow elevated margin, and containing a lead-coloured powder. This is one of the most common species of the genus, and is common on old rails and gate-posts, giving them the appearance of having been imperfectly daubed over with white paint.

VA'RIUS, LU'CIUS, a Roman poet, and a friend and contemporary of Virgil and Horace, both of whom speak of him in terms of the highest praise. (Virgil, *Eclog.*, ix. 35; Horat. *Carm.*, i. 6. 1, &c.; *Epist.* ii. 1. 247; *Ad Pison.*, 55; *Satir.*, i. 5. 40; 6. 55, &c.) From Donatus' 'Life of Virgil,' it is clear that Varius survived Virgil, who died B.C. 19; for Varius is there described as one of the heirs of Virgil, and as one of the poets who undertook the correction of the 'Æneid.' Varius distinguished himself no less as an epic than as a tragic poet. We know of two epic poems of Varius: the one was a description of the exploits of Augustus and Agrippa, which is completely lost, and the second is called 'De Morte,' and was probably an account of the death of Julius Cæsar. Macrobius (vi. 1) has preserved two lines of this poem. As to his tragic compositions, the antients are unanimous in saying that he excelled all his countrymen; and Quinctilian (x. 1. 98) says that the tragedy 'Thyestes' of Varius would bear comparison with any Greek tragedy. (Compare *Dialogus de Caus. Corrupt. Eloquent.* 12; Philargyr. *ad Virg. Eclog.* viii. 10.) But, notwithstanding this general acknowledgment of his merits, no fragments of his tragedies are preserved which can be attributed to him with any certainty.

(Bothe, *Poetarum Latii Scenicor. Fragm.*, i., p. [illegible], &c.; Weichert, *De L. Vario, Poeta, Commentatio*, Grimma, 1829, 4to.; *Poetarum Latinorum Reliquiae*, p. 156, &c.)

VARIX (in Conchology). The swollen or varicose veins probably gave rise to this term, which is used by malacologists to designate the longitudinal thickened elevations occurring at greater or less intervals on the outer surface of spiral shells. These varices are formed by the thickened and reflected edge of a former aperture of the shell, when the animal has increased, by adding to its growth by fresh deposits of testaceous matter beyond such former aperture. Thus many varices or elevated longitudinal ridges, the relics of former apertures, are seen on the spire and body whorl of many marine shells. Examples will be seen in *Ranella*, *Triton*, and *Murex*. [SIPHONOSTOMATA.] The elegant regularity in *Harpa* [ENTOMOSTOMATA] adds greatly to the symmetry and beauty of the shell.

VARIX. [VEINS, DISEASES OF.]

VARLEY, JOHN, an artist who ranks very high as a water-colour painter, in which branch of the art he was almost the first to adopt those principles and processes which have raised it to such eminence in this country, and rendered it capable of effecting upon a small scale nearly all that oil-painting can produce upon a larger one. He was born in London about the year 1777, of parents in rather moderate circumstances, and was about to be apprenticed to a silversmith, very much against his own inclinations, when the death of his father, who had always opposed what he considered an idle talent for drawing, left him at liberty to choose a profession. That his finances were unable to further his views may be taken for granted, since he was fain to content himself at first with obtaining employment with an obscure portrait-painter in Holborn. Afterwards, when about fifteen or sixteen, he received some instruction from a drawing-master of the name of Barrow, with whom he made a sketching excursion, which was of material service to him; for a view which he then made of Peterborough Cathedral brought him into notice. He next became acquainted with Arnold, the landscape-painter, with whom he made a tour through North Wales about the year 1799. On his return from that excursion, he was for some time employed by Dr. Munro in making sketches for him of the scenery in the neighbourhood of his residence at Fetcham in Surrey. Two other professional excursions through Wales in 1801-2, and similar ones through various parts of England, stocked his portfolio with subjects that occupied his pencil for many years, and established his reputation as the first in that department of art he had chosen. He was certainly among the first, if not the very first, who began to advance the practice of water-colour drawing to that of water-colour painting, and to give that mode of execution a solidity and force, a freedom and breadth, which it had not before attained, nor was even supposed capable of. Up to that time, scarcely anything had been produced beyond washed or tinted drawings, very little superior to the coloured prints of the same period—raw and feeble in effect. Varley gave to his paintings nearly all the vigour of oil-pictures, and by a mode peculiar to himself; for he worked with great rapidity, and does not appear to have produced his effects by repeated spunging and other processes now in use, or by admixture of body colour: his colours look as if they had been laid on at once, and hardly retouched. Although he was not an original member of the 'Water-Colour Society' (established in 1804), he afterwards joined it, and his pictures contributed in no small degree to the attraction of its exhibitions. From them and his practice as a teacher he derived a considerable income for many years; but a numerous family, and want of either management or nomy, kept him almost always in difficulties. Besides ich, he devoted much time to the study of judicial as- logy, which he may almost be said to have made a ond profession; for he was in the habit of giving his vice formally to those who consulted him respecting ir 'nativities,' and is said to have received fees on such asions, or at least to have found a liberal purchaser for rawing in a client of that kind. He certainly made secret of his pretensions, nor did he show any disincli- ion for the title of 'Astrologer' publicly attached to name. Of extraordinary predictions by him many ange anecdotes are told; but if he possessed the art of eseeing events, he did not possess that of averting ubles and misfortunes—in his own case at least—which little ordinary prudence would have enabled him to oid. Varley was married twice: his first wife died in 24; his second was the daughter of Wilson Lowry, the ebrated engraver. He himself died November 17, 1842, the residence of a friend, near Cavendish Square.

VARNISH, a fluid applied to the surfaces of various ticles, as wood, &c., and which, by the evaporation or emical change of a portion, leaves upon them a shining ating impervious to air and to moisture.

Varnishes may be divided into three classes, alcoholic spirit varnishes, volatile-oil varnishes, and fixed-oil rnishes.

Spirit or alcohol varnishes are in general prepared very adily, are easily applied, soon become dry, and emit no agreeable smell: they are however liable to crack or ale off, and are incapable of resisting friction or blows.

The following, which are chiefly taken from Aikin's Dictionary of Chemistry,' are among the most approved irit varnishes:—Take of mastich 6 ounces, sandarach ounces, reduced to fine powder, and add 4 ounces of arsely-powdered glass, which prevents the resins from glomerating into a mass or sticking to the bottom of the sel; digest in a quart of spirit of wine, contained in a osely-corked vessel for three days in a warm room, shak- g the mixture frequently; then add 3 ounces of melted enice turpentine to the warm solution, stirring thoroughly ll mixed; let the mixture remain in a warm room for bout a week, and then strain it. This is a strong varnish pplied to chairs and other articles of furniture.

Take of copal, which has been liquefied and afterwards ery finely powdered, 3 ounces, mastich 2 ounces, and emi 1 ounce; digest in a warm room in a quart of spirit, d when the solution is complete add 2 ounces of Venice rpentine. This is stated to form a good varnish for olins and other musical instruments.

For different purposes the ingredients of spirit varnishes e considerably varied; seed-lac, benzoin, anime, frankin- nse, entering into the composition, according to the use be made of them.

The only essential or volatile oil largely used in varnishes oil, or, as it is commonly called, spirit of turpentine; d one of the best varnishes into the composition of hich it enters is copal varnish. [Copal Varnish.] This chiefly used for pictures. Another powerful varnish is repared by adding to highly-rectified oil of turpentine bout an eighth of its weight of caoutchouc: this indeed the varnish now generally employed in waterproofing e garments well-known by the name of Mackintoshes; metimes gas-oil or coal-naphtha is employed for the me purpose, but its smell is more disagreeable, and nger in going off. The preparation of this varnish does ot require the application of heat.

In these varnishes the volatile solvents evaporate, but the case of fat or fixed-oil varnishes, the solvent under- oes a chemical change, and dries with the substance dis- olved—these are sometimes termed fat varnishes. We hall mention two kinds, first the most colourless: this is repared by mixing 4 ounces of copal, which has been iquefied and finely powdered, oil of turpentine, and drying inseed-oil, each 10 ounces; digest in a gentle heat till the hole is dissolved; strain it after standing a few days. This forms a solid and nearly colourless glazing, and dries asily at common temperatures.

The black varnish used by coachmakers is stated to be hus prepared: take of amber 16 ounces, melt it, and add o it half a pint of drying linseed-oil boiling-hot, 3 ounces ach of asphalt and rosin, both in fine powder; stir the aterials together till they are thoroughly melted and in- orporated, add to the mixture a pint of warm oil of turpentine: this varnish is intended to dry to a very hard consistence.

VARNISH-TREES. This name has been applied to several trees which exude liquid resins naturally or from incisions. These become dry in the air, and are employed for preserving various articles from the influence of the air, water, or insects, as well as for giving them greater brilliancy, and also for varnishing pictures. Most of these are found in India, Burma, and China, and have been mentioned under appropriate articles. Many of them belong to the natural family of Terebinthaceæ. Some of these exude an acrid resinous juice, which on drying becomes black, and is used as a varnish, as that of the Anacardium occidentale, or cashew-nut tree. The marking-nut, or Semecarpus anacardium, has its outer coat covered with cells filled with a similar black, oily-looking, acrid juice, which is much used as a marking-ink. Augia sinensis of Loureiro is said to produce the genuine Chinese varnish with which the different fancy articles are lacquered, and which is black when simply dried, but becomes coloured by the admixture of different pigments. The Japan varnish of Kæmpfer and Thunberg is Rhus vernix, and that of the Malayan islands Stagmaria verniciflua, which, according to Mr. Jack, yields not only the lacquer and varnish of Siam and Tonquin, but also that of Japan. Dr. Buchanan informs us that the juice of Holigarna longifolia is used in Malabar for varnishing shields. The theetsee, or varnish-tree of the Burmese, has been described and figured by Dr. Wallich, by the name of Melanorrhœa usitata. He identified it with the Kheu, or varnish-tree of Munnipore, on the north-east of Silhet. A very fine liquid varnish is also yielded by Vateria indica and V. lanceæfolia. The greater part of the trees which yield these liquid varnishes exhale some acrid volatile principle, which renders the air in their immediate vicinity irritating and hurtful to those who come within its influence. This is observed also in some of the species of Rhus, as R. Toxicodendron.

VAROTA'RI, ALESSANDRO, called PADOVANI'NO, a celebrated painter, born at Padua in 1590. His father Dario Varotari was also a distinguished painter and an architect: he was a scholar of Paul Veronese, and established a school at Padua, where he died in consequence of a fall, in 1596, six years after the birth of his son, and in the 57th year of his age. The instructor of Alessandro Varotari is not known, but he went in 1614 to Venice, and devoted himself to the study of the works of Titian: he made some copies after Titian, which were remarkable for their fidelity, and acquired him a great reputation. In his own pictures also he displayed such a mastery over many of the characteristic excellencies of Titian, that he is considered to approach nearer to him than any other of his imitators, in freedom of touch, in mellowness and gradation of tints, and in simplicity of composition. The works of Padovanino are seldom seen out of Venice and Padua. He excelled in painting women and children, but was more successful in the richness of his carnations and in his impasto than in the outlines of his figures. His masterpiece is generally considered the Marriage at Cana, in the Academy of the Fine Arts at Venice, formerly in the monastery of San Giovanni di Verdara at Padua. This painter had several scholars, who painted in his style, and had such facility in copying some of his works, that it is extremely difficult to distinguish some of the copies made by his scholars from the originals painted by Padovanino. He died in 1650. His most distinguished scholar was Bartolomeo Scaligero.

Chiara Varotari, the sister of Alessandro, was a distinguished portrait-painter: her own portrait, by herself, is in the Florentine Painters' Portrait Gallery. She was born at Verona in 1582, and died there in 1639.

(Ridolfi, *Le Maraviglie dell' Arte*, &c.; Lanzi, *Storia Pittorica*, &c.)

VARRO, MARCUS TERE'NTIUS, was born at Rome in the year B.C. 116, and descended from an antient senatorial family. He was instructed by L. Aelius, who is spoken of as a most distinguished person, and afterwards by Antiochus, an Academic philosopher. The whole of his early life must have been spent in the acquisition of that prodigious learning which he afterwards displayed in his works. But he did not on that account withdraw from public life altogether; for in A.D. 67 we find him at the head of a part of the fleet of Pompey the Great in his war against the pirates. During the civil war between Cæsar and Pompey, Varro steadily adhered to Pompey, and was appointed one of his generals in Spain. The western part of the peninsula was placed under his especial protection, and he had two legions at his command. When his colleagues had been compelled to surrender, and Cæsar marched westward, Varro also surrendered in the neighbourhood of Corduba, and after being set at liberty he went to Pompey at Dyrrachium, where he was staying at the time of the battle of Pharsalus. During the absence of Cæsar in Egypt, B.C. 47, Antony destroyed Varro's villa near Casinum, where a great part of his property was lost. After the defeat of Pompey, Varro withdrew altogether from public life, and returned to Italy; and when Cæsar came to Rome Varro became reconciled to him, and was intrusted by him with the purchasing of the books for, and the whole management of, the Greek and Latin libraries, which were then established at Rome. He now enjoyed for a few years perfect peace, and gave himself up entirely to study and the composition of several works. But new troubles arose. After the murder of Cæsar, in B.C. 43, Varro, then a man of upwards of seventy years of age, was put by Antony on the list of the proscribed, apparently for no other reason but because Varro was a staunch friend of republican freedom. Varro himself escaped, as his friends concealed and protected him, until the danger had passed over, but his libraries were irrecoverably lost. After the battle of Actium, B.C. 30, Varro again lived at Rome, and appears to have been highly esteemed by Augustus, who gave him the superintendence of the library founded by Asinius Pollio. Notwithstanding the great loss of books and other property which Varro had sustained, his literary activity remained unabated to a very advanced age. In his eighty-eighth year he was still writing. (Pliny, *Hist. Nat.*, xxix. 18.) He died in the ninetieth (B.C. 27), or, according to Valerius Maximus, in the hundredth year of his age.

Varro was one of the most extraordinary men that ever lived. He was certainly the most learned of the Romans, but his learning was not the learning of the closet only: he had acquired a practical knowledge of men and things during his public career, and on the basis of this solid knowledge he wrote his works in the retirement of his villas. There was scarcely any branch of knowledge with which he was not thoroughly conversant: he was an historian, a philosopher, a naturalist, a grammarian, and a poet, and in all these branches he is spoken of in terms of the highest praise. Varro was for his time and for the Romans what Aristotle was to the Greeks. He himself says that he wrote 490 books ('septuaginta hebdomades,' Gellius, iii. 10), but all of them, with the exception of two and a few fragments of others, are now lost. We shall only mention some of the more important among his lost works, and then add a few remarks on those still extant. 1, 'Rerum Humanarum Antiquitates Libri xxv.;' 2, 'Rerum Divinarum Antiquitates Libri xvi.;' 3, 'De Vita Populi Romani,' consisting of at least eleven books; 4, 'De Gente Populi Romani Libri iv.;' 5, 'De Initiis Urbis Romae Liber;' 6, 'De Re Publica,' consisting of at least twenty books; 7, 'De Philosophia Liber;' 8, 'De Scenicis Originibus Libri,' of which the third book is mentioned; 9, 'De Poetis;' 10, 'De Plautinis Comoediis;' 11, 'De Bibliothecis,' &c. (See the list in Fabricius, *Biblioth. Lat.*, i., c. 7.)

The two extant works of Varro are on the Latin language ('De Lingua Latina') and on Agriculture ('De Re Rustica'). The former, of which a part only is extant, consisted originally of twenty-four books, of which we now possess only books 5, 6, 7, 8, 9, and 10; and these are much mutilated and interpolated. The work was written between the years B.C. 46 and 44, and was dedicated to his intimate friend, M. Tullius Cicero. In the first three of the extant books Varro treats on the origin of words, and in the last three on the accidents of words, such as declension and conjugation. The subject is of such a nature that we cannot judge of him by it; but it is nevertheless of great value on account of the philological remarks as well as various historical and archaeological matters which are mentioned incidentally. The first edition of 'De Lingua Latina' is that of Venice, 1498, 4to., edited by Pomponius Laetus and Rholandellus. The best among the modern editions are the Bipont (1788, 2 vols. 8vo.), that of Spengel (Berlin, 1826, 8vo.), and especially that of C. O. Müller (Leipzig, 1833, 8vo.). The Bipont edition contains a collection of the fragments of Varro's lost works.

The work 'De Re Rustica' is complete, and not in such bad condition as the 'De Lingua Latina,' although antient authors quote passages from it which are not in it now. It consists of three books, and is dedicated to his wife Fundania. Although Varro wrote it at the age of eighty, it is, at least among the Roman works on agriculture, the best that has come down to us. It is written in the form of a dialogue, and in a pleasing and lively style. Besides the subject it professes to treat of, it contains a great number of passages illustrating antient mythology, archaeology and ethics. It is chiefly based upon Greek works, and one written by the Carthaginian Mago. It is printed in the collections of Varro's works published by H. Stephens (1569), Popma (Leyden, 1601, 8vo.), and others; and also in all the collections of the 'Scriptores Rei Rusticae,' the best of which are those by J. M. Gessner, with notes of Ernesti (Leipzig, 1772-74, 2 vols. 4to.), and J. G. Schneider (Leipzig, 1794-97, 4 vols. 8vo.), who has also given a very good Life of Varro.

(Fabricius, *Biblioth. Lat.*, i., c. 7; Orelli, *Onomast. Tullianum*, under 'M. Terentius Varro.')

VARRO, PU'BLIUS TERE'NTIUS, surnamed ATACINUS, a Roman poet, was born, according to Hieronymus in the Chronicle of Eusebius, about the year B.C. 82, at Atax in Gallia Narbonensis, or, according to Wüllner, at Narbo itself. Respecting his life, little is known beyond the facts that he learned Greek at the age of thirty-five, and died in B.C. 37, at the age of forty-five. Varro distinguished himself in epic, elegiac, and epigrammatic poetry, but, with the exception of some fragments of epigrams, his works are now lost. We know of three epic poems of Varro—1, 'An epic on the war of J. Cæsar against the Sequani, 'Bellum Sequanicum,' of which Priscian (x., p. 877) quotes the second book. 2, 'Bellum Punicum Secundum,' which Fabricius attributes to Marcus Terentius Varro, but others, with greater probability, to P. Terentius Varro Atacinus. 3, 'Argonautica:' this poem was a free translation of the 'Argonautica' of Apollonius Rhodius, and was very celebrated among the Romans. It is frequently referred to by contemporary writers, as well as by later grammarians.

(For a more detailed account of this poet, see Wernsdorf, *Poet. Lat. Minores*, v., 3, p. 1385, &c.; and Wüllner, *Commentatio de P. Terentii Varronis Atacini Vita et Scriptis*, Münster, 1829, 4to. In both of these works the remains of the poet are collected.)

VARVICITE. [MANGANESE—*Ores of.*]

VARUS, QUINTI'LIUS. [HERMANN.]

VASA, GUSTAVUS. [GUSTAVUS ERICKSON.]

VASA (vessels), in Botany, a term applied to several of the tissues of plants: see TISSUES, VEGETABLE.

VASA'RI, GIO'RGIO, Cavaliere, born at Arezzo in 1512, was a celebrated painter and architect in his time, but his reputation now rests nearly exclusively upon his Lives of the most excellent Italian Painters, Sculptors, and Architects, 'Vite de' più excellenti Pittori, Scultori, e Architetti,' published in Florence, in 1550, in 2 vols. 8vo., and again in a second edition by himself, in 1568, in 3 vols. 4to., with portraits cut in wood, likewise in Florence, with many new lives of living and deceased artists, up to the year 1567. This work became remarkably popular, and many editions of it have been since published: one at Bologna, from 1647 to 1663, with the same portraits: one at Rome, in 1759, with copperplate portraits, and emendations and annotations by Bottari; again at Leghorn and Florence, with additional notes by Bottari, in 1767-72; another at Siena, in 1791-94, by Della Valle, with some additional information respecting the artists of Siena (this edition was reprinted in the Milan edition of Italian classics); and a complete edition of the works of Vasari was published in Florence, in six volumes, 8vo., in 1822-23, in which the biographies were reprinted from the edition of 1568, without notes, but with copies of the portraits of Bottari's edition. In 1832, Schorn, the late editor of the 'Kunst Blatt,' commenced the publication, at Stuttgart and Tübingen, of a German translation of the Lives, with many original notes, and others selected from former editions; the notes render this edition very valuable, but as yet the first and second parts only are published.

The last life in Vasari's work is his own, which he traced up to his fifty-fifth year. He was instructed in design by is father Antonio Vasari, and in painting by William of larseille; and being taken to Florence, in 1524, by Siliro asserini, cardinal of Cortona, he was there further intructed by Michel Angelo, Andrea del Sarto, and others. asari lost his father, in 1528, of the plague, and in 1529 e turned goldsmith in order to be the better able to assist is family, who were supported by an uncle. He however he same year took up his former profession at Pisa. He fterwards returned to Arezzo, and studied with Francesco alviati, from whom he was taken by Cardinal Ippolito de' Medici, who took him into his service to Rome, and inroduced him to Clement VII. He returned afterwards to Florence, and there, through the encouragement and proection of the Medici family, he met with all the success he ould desire. Few painters have been more successful in oint of patronage, or have executed more works than Vasari; but his paintings are remarkable for no particular excellence, though they are generally correctly drawn, and many of them are conspicuous for a dignity of character which is not common. He was the intimate friend and an enthusiastic admirer of Michel Angelo, and he may be almost termed a servile imitator of his style. The majority of Vasari's works were executed from his designs or cartoons by his scholars, who were very numerous: they painted at Rome a great ceiling with many frescoes for he Cardinal Farnese, in a hundred days, but so little to Vasari's satisfaction, that he determined from that time, 544, not to entrust to them the finishing of any work whatever. Vasari in his 'Life' relates the origin of his iographical work; he undertook it in consequence of a uggestion of the celebrated Paolo Giovio, and at the equest of Cardinal Farnese. It is a vast compilation and work of great labour, whether the production of one or more persons, and remains even now unrivalled by any work of its kind, notwithstanding its numerous inaccuacies and his partiality for the Florentines: the style is xcellent for the period, and the language is both powerul and eloquent. Vasari died at Florence, in 1574, and was buried in Arezzo.

VASCULAR TISSUE. [Tissues, Vegetable.]

VASCULARES, in Botany, applied to the two principal classes of plants, Exogens and Endogens, on account of heir highly developed vascular tissues, in opposition to he class of Acrogens, the tissues of which are principally ellular, and hence they are called Cellulares. [Exogens; ndogens; Cryptogamia; Vegetables.]

VASES (*vasa, σκεύη, ληκύθοι, ἀμφορεῖς*). This word in its idest sense comprises all vessels intended to contain uids, whether they are made of metal, stone, or clay. In orm also vases may be of all varieties of shape, from that f a cup or a saucer, to that which we are accustomed to all vase or urn, in a narrower sense of the word. Antient ases of all these materials and forms have come down to ur time; some of them are simple vessels without any rnament, and others are decorated with reliefs or paintings. The most numerous class of antient vases are those ainted vases of dried or baked clay which have of late ears been discovered by thousands in Etruria, Southern taly, Sicily, Greece, and some of the Grecian islands. hey are only found in the tombs and catacombs of these ountries, and the few other spots in which they are now nd then met with have generally been considered as laces in which they were manufactured. It is remarkable hat no such vases have ever been discovered either at Rome and in central Italy, or in any of the Greek towns f Asia Minor, and that they are found in much greater umbers in Etruria, Southern Italy, and Sicily, than in any art of Greece Proper. Although they are almost inariably found in graves, they do not appear in any case have served as urns in which the remains of the dead ere deposited, but they are always found either standing ound the bodies of the dead, or hung on bronze pegs round he walls of the catacombs. This circumstance, together ith the fact that they are not found at Rome or in central taly, has led to various conjectures as to the meaning of he custom of placing them in graves or tombs. The ost common opinion is, that on certain occasions, esecially when persons were initiated in the mysteries of emeter (Ceres) or Dionysus (Bacchus), they received uch vases as memorials of the solemnity, and that after heir death these vases were deposited in their tombs to ttest the fact of their having been initiated. Others think hat these vases were the prizes gained in contests during certain religious festivals. But neither of these opinions has any foundation, for painted vases are found in the greatest numbers in places (as in Etruria) where the Bacchic mysteries were never introduced, and in places where they existed only for a very short time; and it is also evident that the paintings on most of the vases have no reference whatever to the mysteries. If the vases were prizes given to the victors in solemn contests, their number could not possibly be as great as it is. We also know only of one instance in which vases were given as prizes to the victors in the solemn contests, and this was in the Panathenaea of Athens. Under these circumstances we must be content with the simple knowledge of the fact that in certain countries the antients used to adorn the graves of the dead with these vases, until further discoveries shall show the meaning of the custom.

So long as only a few of these painted vases were known, they were principally valued as relics of antiquity or for their inscriptions, and it rarely happened that the elegance of their forms or the beauty of their paintings was thought worthy of much consideration. It is only of late that they have been regarded as something more than antient curiosities, and nothing is indeed better calculated to give us a correct idea of the universal appreciation of art and beauty among the antients, than the immense number of these painted vases. For the men who made these paintings are not the great masters of the art, but must have formed a numerous class of ordinary artists, painters engaged in the potteries or potters themselves, who had either taste enough to imitate or copy the works of eminent masters, or had imbibed from the works of art with which they were surrounded a taste which enabled them to produce works of their own, many of which are worthy to stand by the side of those of the greatest masters of antient or modern times. That they formed a distinct class of artists, who were probably trained in their craft like other artificers, and that they were not held in any particular esteem, may be inferred from the manner in which they are spoken of by Aristophanes. (*Eccles*, 994, &c.) Among the numerous names of vase painters, which we read on the vases themselves, there is not one that can with any degree of certainty be identified with any of the painters mentioned by antient writers. Here then we have not indeed the works of any particular genius raised above his nation, but the productions of the national genius itself. The period during which the art of vase painting completed its development from the rudest elements to the highest perfection, is comprised in the three centuries before the Christian æra, from B.C. 500 to about 200. Within this period the art went through the various stages which every art has more or less to pass through, and at the end of it the application of it gradually ceased, so that about the time of the Christian æra, and afterwards, those painted vases were valued as much and fetched as high prices as in our own days.

Various attempts have been made to classify the immense number of antient vases, of which specimens are preserved in all the museums of Europe. The differences in vases found in different districts or countries have led some archaeologists to classify them according to certain localities in which manufactures are supposed to have existed. This plan has been adopted by Levezaw, in his description of the vases in the Royal Museum of Berlin; but this system compelled the author to have recourse to the most arbitrary hypotheses, as vases of precisely the same kind occur in places very distant from one another, and the most different kinds are found in the same place. The most convenient criterion for classifying them is their style of painting, which is itself a very obvious distinction, and also marks the different stages of the art. Those which contain the rudest and most imperfect paintings are indeed, on the whole, vases of the highest antiquity; but this is not always a safe guide, for as in statuary certain antique forms, especially when connected with religious worship, became conventional and traditional, and were retained at a time when the art had made great progress, so it is very probable that in some cases the most antient style of vase painting was imitated at a comparatively late period. With this caution we may divide all painted vases into five great classes:—

1. Vases with paintings in the *Egyptian style*.—This name is not meant to imply that they were made in Egypt or by Egyptians, but merely that their style of painting

resembles that on the monuments of Egypt. The characteristics by which vases of this class are easily distinguished are as follows:—The vases themselves are of a somewhat depressed or bulky shape, and of a pale yellow colour, on which the figures are painted in a black or brown colour, sometimes with the addition of purple or white tints. The figures represented are usually animals, such as lions, rams, stags, swans, cocks, sphinxes, and other monsters. Garlands of fantastic flowers run around the vases and make a sort of frame to the figures. Human figures occur very seldom, and it seems that the painter's only object was to give to the vessel a pleasing and suitable ornament. The black and brown colours are usually laid on thickly upon the natural colour of the clay, and are without any kind of varnish; nor are the colours always laid on carefully and equally, so that one part is often lighter or darker than the other. The inner outlines of the parts of the figures are more or less carefully traced in the clay with a sharp or pointed instrument. The character of the design is antique and conventional, but in many instances the figures are full of life, and indicate a feeling for harmony, both in the composition and in the detail. Grace is entirely wanting; some critics have imagined that some of the vases of this class may be as old as the time of Homer, but the best antiquaries are agreed that most of them are not older than the year B.C. 500. The skill and neatness with which the designs are made are very surprising, and these points are on the whole a safe criterion of their antiquity, for in later imitations the designs are usually made carelessly and inaccurately. The inscriptions are sometimes written from right to left, and sometimes from left to right. They are sometimes quite unintelligible, and it is remarkable that certain antient Doric characters occur in a great many of them, whence it has been inferred that they were manufactured at Corinth, or in other Doric places. These vases occur most frequently in the tombs of Volci in Etruria, and in those of Nola.

2. Vases with paintings in the *archaic or antient style.*—The vases of this class have black figures on a red ground, and the figures are no longer mere animals and ornaments of the vessels, but contain scenes taken from the stories about the gods and heroes of Greece, and from the occurrences of ordinary life. The paintings thus have a greater value both on account of the subjects and their containing the distinct germs of further development. The form of these vases, which is usually that of the amphora, has a freedom and elegance of proportions which are wanting in those of the first class. In size they vary from the greatest Panathenaic vases, which contained a whole metretes, down to the smallest size, but they are always of beautiful proportions. The style of painting resembles that of the vases of the first class, as both have the character of undeveloped antiquity, and the peculiarity of the designs has led many critics to attach to them no value at all, and to regard them as mere curiosities. But although art in these paintings has not yet reached the height of free movements, and has not yet the full control over the subjects represented, still they cannot be viewed without regard to their relation to the history of art in general: they mark a distinct period of its development, and contain traces of the same Greek spirit which is so striking in the later and more perfect works of art. The peculiarities of the designs are strong outlines of the main parts of the human body. The shoulders, hips, and upper parts of the legs are broad and muscular; the body above the hips is mostly thin, slender, and contracted. The faces are by no means beautiful, and for the most part without any expression, and only represented in the profile. The eyes appear nevertheless in their whole length, and in male figures they are large and circular; their outlines are traced in the clay with a pointed instrument. In female figures the eyes are rather long than circular, and painted with a brush on white ground. All the movements of the figures are violent, and the artists appear to have aimed at the expression of the highest degree of physical strength. In the representation of animals, especially horses, which frequently occur, the artists were evidently less bound by conventional rules, for the horses sometimes display a considerable degree of boldness and beauty. The number of vases of this class is very great, and it is scarcely necessary to remark that the features which we have here mentioned occur with the greatest possible number of modifications and shades, as the period which produced them was unquestionably one of progression with a gradual transition from the harsh to softer forms. On the whole the forms of the designs bear a strong resemblance to that kind of sculpture of which we possess specimens in the metopes of the temple of Selinus. The character of the designs is such that the time in which these vases were made might be regarded as the same as that to which those of the first class belong. But it is highly probable that the early style may have intentionally been continued even after the art itself had made considerable progress. Such may, for instance, have been the case with the Panathenaic vases, which, being connected with religion, continued to be made according to the antient fashion, though Brönsted (*On Panathenaic Vases*, p. 112) has shown that the prize at the Panathenaea did not consist of the vase itself, but of the oil contained in it. The majority of vases of this class however are generally believed to have been made previous to the year B.C. 430.

3. Vases with paintings in *the severe style.*—In the vases of this class the figures are red, the natural colour of the clay, on a beautiful black ground. White is seldom used, and only to express the white hair of old persons. Although the colour of these vases and their figures present a striking contrast to those of the first two classes, yet the character of their designs is in many cases not materially different from those of the second class; while in others the severity of the designs vanishes and gives way to the beautiful, so that they might be ranked in the fourth class. The inner outlines are in a few instances still marked with a pointed instrument, as we have seen in the first two classes: in a few others the hair only is marked in this manner, while in the majority of cases all the outlines are drawn with the brush. The red figures on the black ground produce a most pleasing effect. The harshness and violence of movement so striking in the archaic vases gradually disappear, and make way for a calm and severe dignity. The artists however did not yet work with perfect freedom, and the designs are rather stiff. The most striking features in the designs are a certain moderation and harmony. The drapery forms varied and rich folds, though they show a conventional regularity. The heads are worked with great care, and sometimes are truly graceful; the hands and feet are better drawn, and with much greater neatness and accuracy than on the vases of the former classes. The hair is still stiff, and betrays a degree of timidity on the part of the artist, and the arrangement of the hair is always very simple. The subjects represented are the same as those on the vases of the second class, but repose is more frequent than action. The forms of the vases have something more elegant than those of the second class, although they present great variations both in shape and size. They occur most frequently in Etruria and at Nola; they often contain inscriptions in characters of a middle kind between the archaic mode of writing and the later one. The period commonly assigned to works of this class is from B.C. 460 to 420. Among the antient sculptures the Aegina marbles are those which bear the greatest resemblance to the paintings of this class of vases.

4. Vases with paintings in *the beautiful style.*—The transition to this style too was, as it has been remarked above, gradual, and it had been prepared by the works of the preceding class, so that in many cases it is difficult to determine whether a work belongs to the third or fourth class. But in all the vases which are regarded as the true representatives of this period, all harshness and severity of style have disappeared: liveliness in the composition, perfect freedom in action and movement, as well as in the drapery, are the essential characteristics of this style. The faces of the figures are of beautiful forms, and the heads are no longer in profile only, but many present their faces to the spectator. All the outlines are drawn with the brush. The feeling for what is essential in art appears to have guided the workmen in all the processes: for all is beauty and simplicity; exaggeration in expression, movement, and ornament are avoided. The colour of the figures, as in the third class, is the natural red of the clay: the varnish is generally of extraordinary fineness and of an unrivalled gloss. The purple tints which are seen here and there in the vases of the first classes never appear here, and in their place white is used to represent a variety of things, such as ribbons, garlands, the flames of

ches, and the like. The inscriptions too are usually nted in white. Vases of this class are not often found Etruria: they are most frequent in Nola, Sicily, and tica. The subjects represented on them are on the hole the same as on those of the third class, but scenes nnected with the worship of Demeter and Dionysus beme more prevalent than before. Thus we find frequent presentations of Bacchic dances, but all are of the noblest nception. Sometimes we also meet with scenes taken om Greek comedies. The most common form of the ases of this kind is that of the slender amphora, the round ydria, and the crater. The vases of this class which show he highest perfection of the art appear to belong to the eriod beginning with the year B.C. 400. A particular ind of these beautiful vases is found at S. Agata de' Goti. hey are especially remarkable for the great softness of heir figures. They are generally believed to belong to he period of Philip and Alexander the Great.

5. Vases with paintings in *the rich style.*—Vases of this class belong partly to the period in which those of S. Agata were made, and partly to the period which followed it. Those of S. Agata have for the most part greater simplicity of design than those of the rich style, which are chiefly found in Apulia and Lucania. In detail they display the highest degree of beauty, but are overladen with figures and ornaments. The vases themselves are usually of a large size, and the artists seem to have been anxious to fill their space as much as possible, and with a variety of subjects, which in some cases have no connection with one another. The varnish on these vases is on the whole like that on the vases of S. Agata, that is, without gloss, and inferior to that on vases of the fourth class. The designs are often executed with considerable carelessness, and evidently show the sinking condition of the art. The figures are very soft, as may be seen especially in the frequent representations of naked figures of females, genii, youths, and hermaphrodites. The hair of the female figures is rich; that of male figures often scanty. The best specimens of this class of vases are of extraordinary beauty, but the worst of them are so bad that they can scarcely be regarded as the works of Greeks. From this circumstance it has been inferred that during this period the art of vase-painting became more and more a mere matter of mechanical labour. The subjects represented are for the most part scenes of the heroic ages, but mystic solemnities and rites, which it is difficult to explain, occur very frequently. Comic scenes also are more numerous than on the preceding class of vases. A particular kind of vases of this class are found in the Basilicata, which have been considered by some as not of Greek origin; but the subjects represented on them, as well as the inscriptions, are Greek, and they probably belong to the time when the art was in its decay.

The precise time at which the use of painted vases as ornaments for tombs ceased cannot be determined, but the cessation of the custom must have been followed by the discontinuance of the manufacture. The cessation of the custom has been accounted for and been connected with various occurrences in the history of Italy. Some have thought that the Social War, which destroyed so much of Greek civilization in Italy, also put an end to the manufacture of these painted vases; others suppose that the suppression of the Bacchic mysteries by the Senatus Consultum de Bacchanalibus was the cause of painted vases being no longer deposited in the graves. The groundlessness of this opinion has been satisfactorily proved by Kramer (*Ueber den Styl und die Herkunft der bemahlten Griech. Thongefässe*, p. 137, &c.), who is inclined to believe that the custom gradually ceased at the time when the Roman sovereignty was established in Italy and Sicily. As the Romans themselves had never adopted the custom, it is not improbable that their influence, without any definite enactment for the purpose, put an end to the custom in Italy and Sicily. Kramer thinks that there are no painted vases of a later date than the second Punic war.

The question as to the place or places where such painted vases were manufactured was never raised, and was not indeed of great importance, until immense numbers of them were found in Etruria. The question then became of no small importance, as it is intimately connected with the whole history of antient civilization; for in the place or places where these vases were produced, the taste for real artistic merit must have been much more widely spread than in any place of modern times. That all the painted vases are of Greek origin is now no longer a matter of doubt, and is sufficiently attested by the subjects represented on them, as well as by the Greek inscriptions, although the precise meaning of some of the paintings and inscriptions will perhaps remain undiscovered. All the opinions which have been set forth in regard to the origin of the painted vases found in Etruria may be divided into two great classes: the one is, that they were manufactured in the country where they are found; and the other, that they were imported from a foreign country or countries. Those who maintained the former opinion believed either that there was in Etruria a considerable Greek population (Tyrrhenians), among whom vase-manufactories were established, and that afterwards this Greek population was absorbed and overwhelmed by the Etruscans; or that there existed at Volci in Etruria one or more corporations of potters who were in close connection with Attica. Those who assert that the vases were imported from foreign parts again differ as to the place or places where they were manufactured, and from which they were exported. Some have regarded Sicily, others Athens or the Chalcidian colonies in Campania, especially Cumæ and Nola, as the places where they were manufactured; but most of these opinions are opposed to well-known historical facts, and supported by very weak arguments; while others are mere hypotheses, formed only because their authors felt the necessity of fixing upon some place or other as the one from which these vases came into Etruria. If we consider the regular and organic development which we have endeavoured to trace in the art of vase-painting, and the resemblance among the vases found in the most distant parts of the antient world, we feel inclined to look to one particular place or country, in which they originated and in which the art was developed. If, in addition to this, we remember that the subjects represented on these vases, as far as they are intelligible to us, belong to the mythical history of Attica, and that the characters in the inscriptions underwent in the period in which the vases were manufactured the same changes as those which we find in Attic inscriptions, together with various other circumstances which are carefully weighed and examined in the work of Kramer above referred to, we can scarcely doubt that Athens was the place where they were manufactured, and from whence they were exported to various other parts of the antient world. Some of the vases belonging to the first class, especially those with Doric characters in their inscriptions, may have been made at Corinth. The principal manufactory at Athens seems to have been in the Ceramicus, a suburb of Athens, which derived its name from *cerameus* (κεραμεύς), a potter. The trade which Athens thus carried on in painted vases must have been very extensive. Other towns too, as we know from Pliny, who speaks only of his own time, had their potteries, in which vessels of various kinds, and some of great beauty, were manufactured for the purposes of ordinary life, and an extensive trade in them was carried on.

We cannot here enter into a description of the mechanical process of making paintings on vases, which has been the subject of much discussion in modern times, but must refer the reader to an able treatise on this point by Hausmann, 'Commentatio de Confectione Vasorum Antiquorum Fictilium, quae vulgo Etrusca appellantur,' Göttingen, 1823, 4to. The dissertations upon particular vases, which have been written of late years, are innumerable: we shall only mention those which give a detailed account of painted vases in general, many of which contain drawings in which the colours of the antient vases are more or less accurately imitated:—L. F. de Rossi, 'Raccolta di Vasi diversi,' Rome, 1713, fol.; Passeri, 'Picturae Etruscorum in Vasculis,' Rome, 1767, 3 vols. fol.; 'Collection of Engravings from Ancient Vases, mostly of pure Greek workmanship, discovered in sepulchres in the Kingdom of the Two Sicilies, now in the possession of Sir W. Hamilton,' by W. Tischbein, Naples, 1798-1803, 4 vols.; C. A. Böttiger, 'Griechische Vasengemälde,' Weimar, 1797-1800, 3 vols. 8vo.; 'Peintures de Vases Antiques, &c., par A. L. Millin, publié par Dubois Maisonneuve,' Paris, 1808, 2 vols. fol.; J. Millingen, 'Peintures Antiques et Inédites de Vases Grecs,' Rome, 1813, fol.; by the same author, 'Unedited Antient Monuments, Painted Greek Vases,' Paris, 1827, 4to.; and 'On the late Discoveries in Etruria,' Supplement to vol. ii. of the 'Transactions of the

Royal Society of Literature;' T. Panofka, 'Raccolta di Vasi Scelti,' Rome, 1826; and by the same author, 'Vasi di Premio, illustrati,' Florence, 1826, fol., with explanatory text in 8vo.; Dubois Maisonneuve, 'Introduction à l'Etude de Vases Antiques, accompagnée d'une Collection des plus belles Formes,' Paris, 1817, fol.; Gerhard, 'Berlins Antike Bildwerke;' Stackelberg, 'Die Gräber der Griechen;' Bröndsted, 'On Panathenaic Vases,' in the 'Transactions of the Royal Society of Literature,' vol. ii. The number of other works, and of those which contain descriptions of the various museums of Europe, is too large to be enumerated here. The work which deserves to be particularly recommended for the critical history of the art of vase-painting is that of Kramer, quoted above (published at Berlin, 1827, 8vo.).

VASSAL. [FEUDAL SYSTEM.]

VASSY. [MARNE, HAUTE.]

VATER, JOHANN SEVERIN, a distinguished German linguist and theologian, was born at Altenburg on the 27th of May, 1771. After having received his preparatory education in the gymnasium of his native town, he went in 1790 to the university of Jena, where he studied philosophy and theology, the latter under Griesbach, Doederlein, and Paulus. From the year 1792 to 1794 he continued these studies in the university of Halle, where he also began his career as academical teacher. In 1796 however he returned to Jena, where he was appointed professor extraordinary in the theological faculty. Along with the Hebrew language, the grammatical knowledge of which was greatly advanced by him, he now devoted himself to the study of a variety of languages, for the purpose of comparison, and of discovering what was then called a philosophical or universal grammar, which was to develop the great principles common to all languages and their respective grammars. In the year 1800 he was invited to go to Halle as ordinary professor of theology and Oriental literature. Without giving up his linguistic studies, he now devoted considerable time to the critical examination of the early books of the Old Testament, and of ecclesiastical history. After the death of Adelung, in 1806, who left his great linguistic work, 'Mithridates,' unfinished, Vater, with the assistance of Adelung's MSS. and of several distinguished scholars, undertook its completion. Adelung had only published one volume, and the other three were published by Vater (Berlin, 1808-17). In 1809 he was appointed professor of theology and librarian in the university of Königsberg, where he continued his linguistic labours with unabated zeal. His studies embraced the languages of civilized nations, as well as those of the tribes of America and Africa. In 1820 Vater returned to Halle as professor of theology, and although he did not altogether abandon his former linguistic pursuits, yet we find him chiefly engaged in ecclesiastical history and the exposition of the New Testament. During the last years of his life he edited several theological and religious periodicals, as the 'Journal für Prediger,' the 'Kirchenhistorisches Archiv,' and the 'Jahrbuch der Haüslichen Andacht,' the last of which he himself had set on foot in 1819. He died at Halle on the 16th of March, 1826.

Vater possessed a more extensive knowledge of languages than any of his contemporaries, although he did not enter into their spirit so deeply as others. His works however are very valuable on account of the immense materials which they contain for the study of comparative grammar.

The following list contains the most important of his linguistic works:—1, 'Uebersicht des Neuesten was für Philosophie der Sprache in Deutschland gethan worden ist, in Einleitungen, Auszügen, und Kritiken,' Gotha, 1799, 8vo.; 2, 'Versuch einer Allgemeinen Sprachlehre,' &c., Halle, 1801, 8vo.; 3, 'Lehrbuch der Allgemeinen Grammatik, besonders für Höhere Schulklassen, mit Vergleichung älterer und neuerer Sprachen,' Halle, 1806, 8vo.; 4, 'Handbuch der Hebräischen, Syrischen, Chaldäischen, und Arabischen Grammatik, für den Anfang der Erlernung dieser Sprachen bearbeitet,' 2nd edit., Leipzig, 1817, 8vo.; 5, 'Literatur der Grammatiken, Lexica, und Wörter-Sammlungen aller Sprachen der Erde, in Alphabetischer Ordnung,' Berlin, 1815, 8vo. (this work is printed in German and Latin); 6, 'Analekten der Sprachenkunde, mit einer Sprachenkarte von Ostindien,' Leipzig, 1820 and 1821, 2 parts; 7, 'Vergleichungstafeln der Europäischen Stammsprachen und Süd-west Asiatischer; R. K. Rask, Ueber die Thrakische Sprachclasse; Albanesische Grammatik nach Fr. Mar. de Lecce; Grusinische Grammatik nach Maggio, Ghai und Firalow, und Galische Sprachlehre von Ch. W. Ahlwardt,' Halle, 1822, 8vo.

VATE'RIA, a genus of plants of the natural family of Dipterocarpeæ, which has been so named in compliment to Abraham Vater, once professor of medicine at Würtemberg, and author of some botanical dissertations, as on the balsam of Mecca, &c. The genus is characterised by having the calyx 5-cleft; segments at length reflexed; petals 5, oval, emarginate, twisted in the bud; stamens 40 to 50, short, inserted between the petals and the base of the germ; anthers long, linear; capsule 3-valved, 1-celled and 1-seeded; cotyledons stalked. The species are only two in number, *V. indica*, which grows all along the Malabar coast and in Canara, and *V. lanceæfolia*, which is common in Silhet. Both species form large trees with entire, smooth, coriaceous leaves, and terminal panicles of white flowers, and both are valuable not only as timber-trees, but for yielding valuable, almost unique products. V. indica grows to the height of about 60 feet, and yields valuable timber, which is much employed in ship-building, and is not liable to be attacked by the teredo; when the bark is wounded, a pellucid, fragrant, acrid, bitter, resinous fluid exudes, which in the rays of the sun becomes yellow and fragile like glass. This resin is well known in commerce, and is usually called copal in India; but when imported into England receives the name of gum anime. The fluid resin also makes a good varnish, which is called *pundum*, or liquid copal; on the Malabar coast it is often called piney varnish, and the tree piney varnish-tree or piney marum. The dry resin, boiled with more or less oil, is used for the purposes of tar and resin; it is also employed by the natives instead of frankincense. Besides these, another very valuable product is yielded by this tree, and that is a fatty substance which is known by the name of the piney tallow, or vegetable tallow of Canara. This is obtained by boiling the seeds, when the fatty substance floats to the surface, and on cooling down becomes of the consistence of tallow. In colour the different specimens vary from pale yellow or fawn, to perfect white. Its general properties, such as its hardness, colour, combustibility, and fusibility, place it between wax and tallow; but it is far superior to the latter, having no disagreeable smell, either when burning or at common temperatures. One hundred parts of the tallow were ascertained by Mr. E. Solly to consist of 98 parts of stearine and two of elaine. The first good account of this substance was published by Dr. Babington, in Brande's 'Journal of Science and the Arts,' 1825, who detailed experiments proving its applicability to candle-making. For this purpose it has the great advantage of being easily cast, as the tallow comes freely from the mould: it burns very well, and gives a good bright flame resembling that of wax, and in economy of combustion it is superior to either spermaceti or wax. Mr. E. Solly (*Proc. of Royal Asiatic Soc.*, 1839) has inferred that it might also be employed in the manufacture of soap. It seems also well adapted for preventing friction in machinery. As this tree is valuable in many points of view, it seems very desirable for more extensive cultivation: a branch cut off and placed in the ground grows rapidly, and the tree comes to perfection in from 15 to 20 years.

V. lanceæfolia is the other species, which was described by Dr. Roxburgh from Silhet, where it is called [illegible]. Like its congener, this also exudes a clear liquid from wounds, &c. in the bark, which soon hardens into an amber-coloured resin. From this the natives distil a dark-coloured and strong-smelling resin called *choon*, and *chora* and *gond* by the Brahmins, who use it as incense. V. indica has been figured by Rheede, *Hort. Mal.*, iv., p. 33, t. 15, and by Dr. Roxburgh, *Coromandel Plants*, iii., p. 86, t. 288.

VATICAN, the name of a hill, a church, and a palace, or rather an assemblage of public buildings, on the right bank of the Tiber, within the walls of modern Rome. The Mons Vaticanus was outside of the walls of antient Rome, and derived its name, according to some, from the 'vaticinia,' or divinations of soothsayers, which were delivered in that sequestered spot; but this seems a fanciful derivation (A. Gellius, xvi. 17). Pliny (*Hist. Nat.*, xxxvi.) speaks of an evergreen oak of great antiquity, older than Rome itself, upon which was an inscription in Etruscan characters, signg that it was a sacred tree. The Vatican was within territory of Etruria before the Romans spread their inion north of the Tiber. Part of the Janiculus was -wards enclosed by walls, but the Mons Vaticanus never enclosed, either under the republic or the empire. In the n between the hill and the Tiber Caligula constructed a s for chariot-races, and placed an obelisk in the middle , the same which now stands before St. Peter's Church. circus, being afterwards used by Nero, was called by his e; Nero had also gardens in the same neighbourhood. circus was destroyed under Constantine, who built on site a church or basilica, dedicated to the Apostle er, whom tradition reported to have been buried on that . This church is said to have been consecrated by e Sylvester I., and to have been enriched by Constan- with splendid ornaments and ample revenues, which succeeding Christian emperors greatly increased.

'ope Leo IV., about A.D. 850, walled round part of the tican hill and the plain beneath, to protect the church St. Peter against the incursions of the Saracens, and he ve the unenclosed grounds to a number of Corsican ilies, which, having been driven from their country by Saracens, had taken refuge at Rome. It then became uburb of Rome, and was called 'Leonina Civitas.' This rict is now called by the name of 'Il Borgo.' In the r 1146. Eugenius III. began building a palace near the rch of St. Peter for the Papal residence, which grew by grees, under successive popes, into an immense mass of ldings, known by the general name of the Vatican. e Lateran palace had been formerly the residence of the es. [LATERAN.] Gregory XI. on his return from ignon fixed his permanent residence in the Vatican on count of the protection of the neighbouring castle of St. gelo. The palace of the Vatican continued to be the idence of the popes, until about the middle of the 16th tury. when Paul III. built the palace on the Quirinal ount, which, on account of its healthier and purer air, s since been preferred to the Vatican, which is however ed occasionally as a winter residence, as well as on the casion of grand 'funzioni,' or church ceremonies, being rformed in St. Peter's, when the pope removes to the atican to be near at hand.

The old church of St. Peter was a large structure, more an 300 feet in length: it lay lower than the present urch, which has been raised above it, and which is much ger. Part of the antient church is become a subterra- ous vault under the pavement of the modern building: contains chapels, and altars, with old monuments, sculp- es, and mosaics, and the public have access to it on rtain days only.

Nicholas V. was the first who, about the year 1450, ought of building a new church, as the old one was in a inous state, but the undertaking was abandoned for about lf a century, until Julius II. commissioned the architect amante to make a plan of the intended structure. The an of Bramante was a Latin cross, surmounted by a vast d lofty dome. Julius II. himself laid the first stone on e 18th of April, 1506. Bramante raised the enormous llars which support the cupola. After the death of lius and Bramante, Leo X. entrusted the work first to iulio di San Gallo, and to Raphael d'Urbino, who was an chitect as well as a painter, and afterwards to Peruzzi, ho altered Bramante's plan into that of a Greek cross, but fected little towards its execution. After Peruzzi's death, ope Paul III. sent for Michel Angelo, who carried forward e works with his characteristic energy, raised the drum the cupola, covered over the body of the church, and sed the inside with stone. After the death of Michel ngelo, his pupil Barozzi or Vignola continued the build- g, and cased the exterior with travertino. He died in 73, and little more was done till 1585, when Sixtus V. solved that the dome should be finished, and commis- oned Domenico Fontana and Giacomo della Porta, who, fter making the necessary plans and arrangements, began e work in July, 1588. It was carried on night and day: x hundred workmen were employed on it, and in May, 590, the last stone, after being solemnly blessed by the pe, was fixed in its place at the sound of a discharge of non from the Castle St. Angelo. By the following ovember the crowning of the dome was completed. ul V. (Borghese) being elected pope in 1605, appointed rlo Maderno to be architect of St. Peter's, who length- ed the nave of the church, so as to give it the shape of a Latin cross. He then built the portico, which was finished in six years, and was open to the public in 1612. Two years after, the whole structure was completed. Sixtus V. and his architect Fontana had already raised the obelisk before the church. Paul V. and, after him, Innocent, constructed the two magnificent fountains by the sides of it; and Alexander VII. began in 1661 the two semicircular colonnades which enclose the Piazza, or open area in front of the church. Bernini was the architect of this last work, which was finished in 1667. Lastly, Pius VI. built the fine Sacristia and Chapter-house which adjoin the church.

Such a building as St. Peter's, carried on under so many different hands, and upon different plans, for a period of more than a century, must have faults and incongruities. The portico in front is mostly objected to, as not corresponding to, and spoiling the view of the church itself. But with all its faults, St. Peter's as a whole may be safely said to be the most magnificent structure raised by man. Its interior well corresponds with its external appearance: the proportions are so well kept, that the eye, at first, is not struck with the vastness of the edifice, until moving on we examine some of the parts separately. For a description of the structure itself, and its gorgeous ornaments in marble, bronze, stucco, and gold, its altars, chapels, paintings, mosaics, sculptures, and numerous sepulchral monuments, we must refer the reader to the guide and tourist books, and to the following professional works:—Fontana, 'Descriptio Templi Vaticani,' Rome, 1694; Costaguti, 'Architettura della Basilica di S. Pietro, in Vaticano,' Rome, 1684; Cancellieri, 'Descrizione della Basilica Vaticana, con una Biblioteca degli autori che ne hanno trattato,' Rome, 1778; Poleni, 'Memorie Istoriche della gran Cupola di S. Pietro,' Padua, 1748. Concerning the former church and the vaults, under the modern one, see 'Descriptio Basilicæ veteris Vaticanæ, auctore Romano ejusdem Basilicæ Canonico cum notis Pauli de Angelis, quibus accedit Descriptio brevis novi Templi Vaticani, nec non utriusque Ichnographia,' Rome, 1646; Torrigione, 'Le sagre Grotte Vaticane,' Rome, 1618-39; and P. L. Dionisius, 'Sacrarum Vaticanæ Basilicæ Cryptarum Monumenta æneis Tabulis incisa et Commentariis illustrata,' Rome, 1773.

The assemblage of buildings called by the name of the Vatican, and which extends in an oblong irregular mass north of the church as far as the town walls, consists mainly of—1, the Papal palace; 2, the court and garden of Belvedere; 3, the library; 4, the museum. The Papal palace contains, among other remarkable objects, the Sistine and Pauline chapels, painted by Michel Angelo: the Sistine chapel contains the painting of the Last Judgment; the four 'stanze,' or apartments, painted by Raphael; and the 'logge,' or open galleries, painted by Raphael's pupils under his direction. [RAPHAEL.] There are numerous other apartments, with paintings and other objects worthy of notice, which are described in the guide-books. The principal staircase, made by Bernini, is a splendid work of art. The Vatican is said to contain altogether eight great staircases, more than twenty courts, twelve great halls, and several thousand apartments large and small. A corridor, about a thousand feet long, joins the Papal palace to the building called Belvedere, which serves as a museum. About halfway up this corridor is the entrance to the Vatican library, which was built by the architect Fontana under Sixtus V. Pope Nicholas V. was the founder of the Vatican library, which has been increased by many popes. The libraries of the duke of Urbino, of the Elector Palatine, of Christina of Sweden, of the family Ottoboni, and others, have been added to it. It now contains 80,000 printed volumes and 24,000 MSS., of which 5000 are in Greek, 16,000 in Latin, and 3000 in the Oriental languages. (Valéry, *Voyages Littéraires en Italie.*) Partial catalogues of this great store of learning have been published by Assemani, Marini, Mai, and other librarians.

The museum, or collection of works of art, mostly of antient sculpture, was begun by Clement XIII. and Clement XIV., and greatly increased by Pius VI., who was a man of taste, and who gave it the name of 'Museo Pio-Clementino.' It was illustrated by Gio. Batta Visconti and his son Ennio L. Visconti, in 7 vols. folio, with plates, Rome, 1782. Pius VII., during his troubled pontificate, began a new collection, to which has been given the name of Museo Chiaramonti. The two together, which are distributed along the court, garden, and palace of Belvedere, constitute the richest museum in Europe. Another and more extensive garden belonging to the pope is annexed to the Vatican palace, and extends along the brow of the hill. For a further account of all these we must refer to the splendid work of Pistolesi, 'Il Vaticano descritto ed illustrato,' published in numbers, which began to appear in 1829.

VATI'NIUS. [CICERO.]

VATTEL, EMMERICH, the celebrated writer on international law, was born at Couret, in the principality of Neufchâtel, in 1714. The family was of considerable antiquity in the principality. Emmerich's father David, a clergyman, had been ennobled by the king of Prussia. John Frederick, an elder brother of Emmerich, entered the French service, and rose to the rank of lieutenant-colonel and knighthood. Charles, a younger brother, entered the Sardinian service, and fell at the passage of the Tanaro. Jacob Vattel, who represented another line of the same family, was burgomaster of Neufchâtel in 1762.

Emmerich was educated for the church. He was sent to the university of Bâle to study the classics and philosophy. Having completed the usual curriculum of the Faculty of Arts, he returned to Neufchâtel, and passed with distinction the preliminary examinations, which all who proposed to enter the church had to undergo before commencing their theological studies. He then repaired to Geneva, to devote himself to those strictly professional pursuits. The writings ot Leibnitz and Wolff had however more attractions for him than the 'Institutes' of Calvin. It was an age in which literary men were caressed and promoted at courts, and young Vattel felt a greater vocation for such worldly advancement than for the charge of a rural parish. In 1741 he proceeded to Berlin, in the hope that the court of Frederick II., who had recently ascended the throne of Prussia, and whose taste for literature was general, might afford a field for his talents. At Berlin Vattel contracted an intimacy with Jordan. In 1742 he published a defence of Leibnitz's system, which he dedicated to Frederick. His wish was to enter the diplomatic service of Prussia, but no vacancies occurred, and his fortune was too limited to admit of a lengthened attendance at court. In 1743 some overtures from the court of Dresden, which sought to rival that of Berlin in a reputation for the patronage of art and literature, induced Vattel to visit that city. The gracious reception he experienced from Count Brühl decided his resolution to enter the service of the king of Poland and elector of Saxony.

It is extremely doubtful in what capacity Vattel was attached to the Saxon court in 1744-45. In 1746 he obtained the appointment of diplomatic counsellor (conseiller d'ambassade), with a pension, and was sent to Berne as the king of Poland's minister with that republic. The duties of a Polish ambassador at Berne were not very onerous: Vattel was able to spend the greater part of his time with his family at Neufchâtel, and to devote himself to literary pursuits. In 1746 he published a collection of essays. In 1747 it was reprinted, under the title of 'Philosophic Leisure,' and dedicated to Count Brühl. Some of them have the appearance of having been previously published in some periodical—possibly the 'Journal Helvetique.' The subjects are sufficiently diversified:—'Essai sur le fondement du Droit Naturel;' 'Sur les Moyens de répondre aux Manichéens;' and 'Sur la Nature d'Amour, à Mademoiselle de M.' They evince a cultivated taste for French literature, with an easy play of good-natured but not very brilliant wit. The discourse upon love is dated 1741. In 1757 he published 'Poliergie,' a collection of miscellanies in prose and verse. But the chief employment of Vattel during the ten years which elapsed between the appearance of these two volumes was the preparation of his work on the law of nations. The first edition was published at Neufchâtel (the title-page has the fictitious place of publication 'Londres') in 1758.

About the time that the work appeared he was called to Dresden, and received an appointment in the diplomatic bureau. He gave so much satisfaction as a practical diplomatist, that he was soon raised to the rank of a privy counsellor. His intense application to business undermined his constitution, and in 1766 he was obliged to visit his native country in search of health. The favourable symptoms produced by relaxation and the mountain air encouraged him to resume his labours before his health was quite re-established. His complaint returned with increased violence soon after he reached Dresden, and a second visit to Neufchâtel proved unavailing. He died on the 28th of December, 1767. He had married at Dresden, in 1764, Marianne de Chêne: one son, the issue of this marriage, was alive in 1773.

The work by which Vattel is best known is his 'Droit des Gens.' It is the work of a scholar, not of a practical diplomatist; for the almost nominal charge of Polish envoy to the republic of Berne could afford but scanty experience. It evinces no very extensive acquaintance on the part of the author with treaties or negotiations, or with political history: his principal authorities are the systematic writings of Grotius, Puffendorf, and Wolff. According to the custom of the period, an imaginary law of nature is substituted for the real practice of nations. In respect to its doctrinal merits, the work has all the speciousness and superficiality which characterise the moralists of the 'Encyclopédie.' The work however attained an extensive reputation. It had the fashionable tone of the age, and was therefore more relished than Grotius and Puffendorf; and its systematic arrangement was found useful by practical diplomatists, as it enabled them to classify the fruits of their own experience. It became a text-book in the universities, and was quoted by negotiators when it favoured their views and other authorities were wanting. The original French text has gone through many editions:—Londres (Neufchâtel), 1758, 4to.; Nenfchâtel, 1773, 4to.; Amsterdam, 1775, 4to.; Bâle, 1773, 12mo.; Nîmes, 1783, 4to.; Lyon, 1802, 12mo.; Paris et Lyon, 1820, 8vo. (a bad edition); Paris, 1820, 8vo. (the worst edition); Paris, 1830, 8vo. (an indifferent edition); Paris, 1838, 8vo. (a good edition); Paris, [illegible] 8vo. (the best edition). There have been three Spanish editions:—Madrid, by Hernandez, 1820; Burdeos, by J. G. 1822; Paris, by Atarena, 1824. The last two translations are mere plagiarisms of the first. An English translation was published in 4to. in 1760, and reprinted in 8vo. in 1793. Mr. Chitty, in 1833, republished the version of 1798, with valuable notes, containing the most modern rules and decisions. A German translation by [illegible] was published at Frankfort-on-the-Main, in 1760.

Next in importance among the works of Vattel is one entitled 'Questions de Droit Natural, et Observations sur le Traité du Droit de la Nature de M. le Baron de Wolff,' Berne, 1762, 12mo.; Paris, 1763, 12mo. This is a [illegible] examination of Wolff's treatise, characterised by that [illegible] for arrangement and lucid expression which is the [illegible] merit and source of attraction in Vattel's writings.

The remaining works of this author are of little consequence:—1, 'Pièces Diverses, avec quelques Lettres de Morale et d'Amusement,' Paris, 1746, 12mo. This collection was republished at Geneva and Dresden, in 1747, 12mo., under the title 'Le Loisir Philosophique, ou Pièces Diverses de Philosophie, de Morale, et d'Amusement,' and again at the Hague, in 1765, in 8vo. under the title 'Amusements de Litérature, de Morale, et de Politique;' 2, 'Poliergie, ou Mélanges de Litérature et de Poésies, par M. de V***,' Amsterdam (Paris), 1757, 12mo. 3, 'Mélanges de Morale, de Litérature, et de Politique,' Neufchâtel, 1770, 12mo.

(*Helvetische Lexicon*, von Vattel; *Sketch of Vattel's Life*, prefixed to the edition of 1773; Quérard, *La France Littéraire; Biographie Universelle.*)

VATTIER, PIERRE, was born near Lisieux in Normandy, and lived about the middle of the seventeenth century. He was physician to Gaston, duke of Orleans, and devoted a great part of his time to the translation of Arabic writers on history and medicine. The titles of his published works are as follows:—1, 'L'Histoire Mahometane, ou les quarante-neuf Chalifes du Macine,' Paris, 1657, 4to.; 2, 'L'Histoire du Grand Tamerlan,' Paris, [illegible] 4to., from the Arabic of Achamed, son of [illegible]; 3, 'Portrait du Grand Tamerlan,' Paris, 1658, 4to.; 4, 'L'Onirocrite Mussulman, ou Interpretation des Songes,' Paris, 1664, 8vo., from the Arabic of Gabdorrachaman son of Nasor; 5, 'Merveilles d'Egypte selon les Arabes,' Paris, 1666, 12mo., from the Arabic of Murtadi. This was translated into English by John Davies, and published, London, 1672, 8vo.; 6, 'La Logique, traduite d'Arabe,' Paris, [illegible] 8vo., from Avicenna; 7, 'De Morbis Mentis Tractatus,' Paris, 1659, 8vo., also translated from Avicenna, of the

of whose works he promised a translation, which he
to have completed, but which was never published;
legie de Thograi,' Paris, 1660, 8vo.; 9, 'Nouvelles
es sur la Nature des Passions,' 1659, 4to., which
rs to be the only work of his own composition. His
ations are said to be inaccurate, and in many parts
plete.

oreri, *Dictionnaire Historique;* Eloy, *Dictionnaire
rique de la Médecine.*)

UBAN, SEBASTIEN LE PRESTRE DE, was
May 1, 1633, at St. Leger de Foucheret, near Saulieu
rgundy. His family had been in possession of the
ip of Vauban for more than 250 years, but from mis-
e or otherwise the estate became incumbered with
; and both his father, Urbain le Prestre, who had
his life in the service of his country, and his mother,
e de Carmagnol, dying while he was young, he was
the care of M. de Fontaines, prior of St. John, at
r, who generously supported him, and besides teach-
im to read and write, gave him the only instruction
thmetic and geometry which he ever received from a
ptor. Unwilling probably to remain a burthen to his
actor, and stimulated by the example of his uncles
rothers, all of whom were in the army, he entered at
teen years of age into the regiment of Condé, which
hen in the service of Spain, and he was received as a
in the company of Arcenai. In this situation his
conduct soon procured for him a commission; and
g to the experience acquired in the field a know-
of the mathematics as far as they are connected with
ilitary art (for he had then studied trigonometry and
uration), having probably also read the writings of
talians on fortification, he was qualified to undertake
uties of an engineer.

the beginning of the year 1652, when only nineteen
of age, he was employed on the fortifications of
mont in Lorraine, and in the same year he was sent
thence to serve at the siege of Ste. Menehould. Here
uperintended the construction of the lodgments, and
ng the assault of the place he performed the daring
loit of swimming across the river under the fire of the
my. In the following year he was taken prisoner by a
y of French royalists and brought before Cardinal
arin, who, having heard of his gallantry, received him
ly and solicited him to enter the king's service. Vauban
ily consented to take this step, having had no other
ve in following the standard of Condé than the desire
udying the art of war under that great general; and
as immediately appointed to a lieutenancy in the re-
nt of Burgundy. In that year (1653) he served under
hevalier de Clerville at the second siege of Ste. Mene-
d, and after the taking of that place he was appointed
perintend the repairs of its fortifications. In the fol-
ng year he assisted at the siege of Stenay, and three
ths afterwards at that of Clermont. Both of these
es were taken, and in 1655 he received the commis-
which placed him in the corps of engineers. During
year he directed the sieges of Landrecies, Condé, St.
lain, and Valenciennes; and in 1657 that of Mont-
i, where he received three wounds. In 1658 he had
chief direction of the attacks at the sieges of Grave-
, Ypres, and Oudenarde. The Maréchal de la Ferté,
r whom he served, and who, in 1656, had given him
mpany in his own regiment, as an acknowledgment of
uperior merit gave him then one in another regiment,
ventured to predict that if the life of the young
r were spared he would attain the highest dignities.
inal Mazarin also sent him a present, accompanied by
ering expressions of esteem, which stimulated the in-
ous mind of Vauban to still greater acts of zeal for
public service: in fact so much does he appear to
been occupied by his duties, that only, it is said, by
accounts given of his exploits in the government
ers his relatives obtained any knowledge of his
ence.

itherto Vauban had to make his way without any of
advantages which wealth or the patronage of the great
ures: but from this time he enjoyed the confidence of
government, and his history may be said to be con-
ted with that of his country.

n 1661 occurred the peace of the Pyrenees; and then
nkirk, Fort Louis, and Mardike having been ceded to
nce, the king (Louis XIV.) determined to strengthen their fortifications, so that they might constitute a bulwark against the Spaniards, who then possessed Artois. He committed this important duty to Vauban, who accomplished the proposed end to his satisfaction, and at the same time conciliated the inhabitants by causing a canal to be cut, which was to allow, in case of necessity, a commercial communication between those places. At this time also it is said that he gave plans for improving the fortifications of Cherbourg.

When the war recommenced in 1667, Vauban had the direction of the sieges which the king conducted in person; and at Douay he received in his face a musket-ball, the scar from which he carried to his grave. Notwithstanding his wound, he conducted the siege of Lille, and succeeded in taking the town after nine days from the opening of the trenches. The king, who was present, gave him on this occasion the appointment of lieutenant in the French guards, together with a pension and the more flattering distinction of a public eulogium.

After the peace of Aix-la-Chapelle (1668) he was occupied in superintending the repairs of the fortifications of Flanders and Artois; and in the same year he was made governor of Lille, the citadel of which town he had constructed. He also gave plans for executing new works in Provence and Roussillon; and he went with M. de Louvois to Piedmont, where he visited Verrua, Vercelli, Turin, and Pinerola, and suggested projects for improving their fortifications. At his departure the duke of Savoy presented him with his portrait enriched with diamonds; and on his return from Italy he went to superintend the works which were being executed at Dunkirk, where 30,000 men were constantly employed with admirable regularity.

In 1672, the Dutch having united themselves under the Prince of Orange in opposition to France, Louis XIV. proceeded in person to the seat of war; and under the direction of Vauban several places were besieged and taken: in the following year Maastricht was invested; and here Vauban made a great improvement in the mode of conducting the attack, by executing long trenches connecting at intervals the several lines of approach, and forming covered communications by which the different divisions of the attacking force were enabled to support each other. In or near the fronts of these trenches he placed the batteries destined to silence the fire from the place. Vauban immediately afterwards reconnoitred the fortifications of Trèves, and having given directions for the prosecution of the siege, France being at that time threatened on all sides, he proceeded to visit the fortifications on the coast. After giving orders for the construction of new works for the defence of the Isle of Ré, he returned to Flanders, and subsequently he rejoined the king, who was then carrying the war into Franche Comté. But the allies having in the meantime invested Oudenarde, he entered that place, and conducted the defence so vigorously that they were obliged to raise the siege; and for these services he was, in 1674, made brigadier of the French infantry.

During the following year the armies of France were compelled to act on the defensive; but in 1676 Vauban besieged Valenciennes, and took the place after an assault made by daylight, in opposition to the opinions of the generals of the army, who gave the preference to a night attack. During this campaign he was made maréchal de camp, and received a pension, besides a present from the king, of 25,000 crowns. In the following year he conducted the siege of St. Guislain under Marshal d'Humières, and the fall of that place was followed by that of Ghent. Ypres was immediately invested, and soon afterwards taken. At this time the death of the Chevalier de Clerville, who was director-general of the fortifications, left that post vacant, and the king immediately conferred it on Vauban. It is said that at first he declined it on the ground that it would bring him into close intimacy with the ministers. These were Louvois and Colbert, men jealous of each other; and Vauban probably felt that it would be difficult to give satisfaction to both: he was at length induced to accept the post, and he appears by the uprightness of his conduct to have succeeded in acquiring their esteem.

The peace of Nimeguen (1678), which relieved Vauban from the duty of taking fortresses from the enemy, enabled him to direct all the energies of his mind to the improvement of those which belonged to his country. He first went to Dunkirk, where, by cutting through the sand-bank which closed the entrance, and providing the means of keeping the channel open by directing through it a current of water, he rendered the harbour one of the most important in the north of France: from hence, proceeding to the south, he gave plans for enlarging the fortifications of Toulon, and for the construction of its arsenal; and making Perpignan the centre of the defences of the Eastern Pyrenees, he caused the fortress of Mount Louis to be constructed. Returning to the north, he was employed in improving the chain of fortresses along the frontiers on that side: with this view he completed, near Calais, the fort of Neulay and that of Lakenoque, by which the communication between Ypres and Menin was protected, and Cassel covered. The construction of the works of Maubeuge and the repair of those of Charlemont served to secure the line between the Scheldt and the Meuse, which was before imperfectly protected by Philippeville; and a chain of new fortresses closing up the Vosges secured the conquest of Alsace. The fort of Huninguen near Basle protected the frontier of the Rhine and the Jura; and the new forts which he caused to be built at Fribourg served to render that important place nearly impregnable.

While the execution of these works was in progress, Vauban went again (1680) to the south, where he formed a plan of defence for the Western Pyrenees, improving the port of Bayonne and making that place the grand depôt, while St. Jean Pied-de-Port served to connect the line of defence with the mountains: he also caused the fort of Andaye to be constructed for the purpose of defending the mouth of the Bidassoa. In 1681 Vauban was employed in adding new works to Brest, Rochfort, and other places for the protection of the coast; but these works were scarcely traced when he was called upon to strengthen those of Strasbourg, a free city which had fallen into the hands of the French. He constructed the citadel of that place, and connected the fortifications of the city with the right bank of the Rhine by means of fort Kehl, and by several strong redoubts; facilitating the arrival of materials for the works by cutting a canal with sluices, the construction of which he superintended in person.

Hostilities breaking out in 1683, Vauban proceeded in the following year with the French army into Belgium, where in four days he took Courtray, and immediately laid siege to the strongly fortified city of Luxembourg: this place was also taken, but not till all the resources of the art of attack had been displayed; and it is said that on this occasion he first constructed trench-cavaliers for the purpose of dislodging the defenders from part of the covered-way, previously to an assault being made. In reconnoitring by night for the purpose of ascertaining the height of the glacis, being accompanied only by a few men at a distance, he was discovered by the sentinels; but he was fortunately enabled to retire in safety, having first deceived them by walking coolly towards them as if he had been one of their own officers.

The war being suddenly terminated in 1684, Vauban strengthened the fortifications of Luxembourg, by the addition of a crown, and a horn-work beyond the ravine on the western side of the town; and, in order to become completely master of the course of the Moselle, he then constructed the fort called Mount Royal. About the same time he was enabled to display his talents as a civil engineer by executing, in part, the magnificent aqueduct of Maintenon, by which the waters of the Eure were to be conveyed to Versailles. In 1686 he visited the great canal of Languedoc, which had just then been executed; and he is said to have suggested some improvements which were afterwards adopted.

Two years afterwards, the war again broke out, and Vauban was immediately employed under the Dauphin, in conducting the sieges of Phalsbourg, Manheim, and Frankenthal: the first of these places, whose fortifications he had strengthened in 1676, held out twenty-two days from the time of opening the trenches; and most of the engineers under his orders being killed or wounded, the duty of superintending the operations fell almost wholly on himself. This year he was made lieutenant-general, and the king in a complimentary letter recommended him to be careful of his life for the good of the service. The Dauphin, as a token of regard, presented him with four pieces of cannon for his Château de Bazoche. It is said to have been at the siege of Phalsbourg that Vauban first put in practice the method of ricochet firing; and that he proposed the organization of a corps of sappers expressly for siege duties. In this year he began the fortresses of Landau and Befort.

The following year (1689) Vauban had the comma Dunkirk, Bergues, and Ypres, with orders to enter and conduct the defence of any of these places, should be besieged; but no investment took place. During year 1690 Vauban was rendered incapable of doing military duty in consequence of a severe illness which contracted while superintending the repairs of the fortifications of Ypres: he recovered however, and next year besieged and took Mons. In 1692 the siege of Namur formed under the orders of the king, and the first attack directed against fort Guilleaume, a strong work which been constructed by the celebrated Coehorn, who then manded it: the fort was obliged to surrender to the fortune of Vauban, who succeeded in cutting off munication with the town, and the latter was soon wards taken. The siege of the fort and town days from the opening of the trenches, during which five strong sorties were made by the garrison. In conducted the siege of Charleroi.

The duke of Savoy threatening to invade Dauphiné Vauban was sent into the south of France to ascertain state of the fortresses on that side, and he gave plans improving the works at Briançon; for fortifying trelles, and constructing fort Dauphin. In 1694 the ports being frequently bombarded by the English application was made to Vauban, who suggested the mation of magazines and casemates which should be against the destructive effects of shells and red-hot In 1697 he besieged and took Aeth in a few days from the opening of the trenches. After the peace of Ryswick Vauban was employed for several years in visiting the frontiers and in forming projects for the defence of the country; and in the year 1698 he commenced the aut fortress of New Brisach.

The War of the Succession commencing in 1703 Vauban proceeded to Namur, in order to superintend the of the fortifications; and at this time the king, as a pense for his many services, elevated him to the dignity a marshal of France: this honour he at first declined urging that it would put it out of his power to serve country by directing any future siege, as he could not that rank act under a general of the army. He at last however accepted it; and he readily consented soon wards to conduct the siege of Old Brisach, under the of the young duke of Burgundy, the pupil of Fé This was one of the places which Vauban had cons and it surrendered on the fourteenth day.

In 1706, after the battle of Ramilies, Marshal V was sent to command at Dunkirk and on the coast of ders, where his presence served to support the the people, who were much discouraged by the which the armies of the country had sustained during war. He succeeded in dissuading them from their project of inundating the district in order to the enemy from besieging that town; and he immedi commenced an intrenched camp, extending from D to Bergues, by which the town was more effectually secured.

This was his last public work, for he died, March 1707, after an illness of eight days, in the seventy- year of his age. He had married Jeanne d'Anno family of the Barons D'Espiri, in Nivernois), who before him; and he left two daughters, the countess Villebertin and the marquise D'Ussé.

During the intervals of his services in the field he ployed his leisure in composing his three principal these are entitled 'Traité de l'Attaque des Places,' 'Tr des Mines,' and 'Traité de la Défense des Places.' The last was finished only a short time before his death. Several editions of these works have been published and the best is that of Foissac, Paris, 1796. During his life also found time to write a great number of memoirs various subjects; and near the end of his days he collected them in twelve folio volumes (MS.). He entitled these his 'Oisivetés;' and among them is a paper on the practised in collecting the *dixme royale*: one on the of ecclesiastical power in temporal matters; one on the cultivation of forest-lands; and several on finance, on graphy, and on different parts of the mathematics: there is also a memoir concerning a project for joining the of maritime Flanders with the Lys, the Deule, the Sca the Scheldt; and one concerning the defence of Paris. onsequence of the disasters experienced during the paign of 1706, the king contemplated abandoning his tal and retiring behind the Loire; and on this occasion ban wrote the memoir last mentioned, in which he ited out the importance of preserving Paris, and the ibility of defending it, adding a plan of the fortifica- s which he proposed to construct for its defence. This noir was published in 1821.

ontenelle, in summing up the military actions of Vauban, rves that he superintended the repairs of 300 old for- ses, and executed 33 new ones; that he conducted 53 es, many of them under the eye of the king, and that vas present at 140 vigorous actions. He was much ved by his soldiers, who obeyed him willingly, both the confidence which they placed in him, and from knowledge that he avoided exposing them as much he good of the service would permit. At the siege of nbray the king, by the advice of the persons about him, on the point of ordering that an assault should take ce, and that the garrison should be put to the sword: uban alone opposed this advice, observing that it would preferable to save one hundred French troops than to troy 3000 of the allies; and the king had the good sense bandon the idea. The humanity of Vauban's character lso manifest in the effort which he made to induce the to re-establish the Edict of Nantes: unhappily, the otry of the king or the influence of the priesthood ren- ed his representations on this point fruitless. He had constant system in fortifying places, and he appears to e followed in some respects the method of the Italian ineers: what are called his three systems have been ned since his death, from a diligent study of the works ch he executed at different times. In 1693 the Order St. Louis was founded, chiefly by the advice of Vauban, was immediately invested with the dignity of Grand s of the Order, he being one of the seven to whom t dignity was at first confined. When the Académie Sciences was renewed, in 1699, Vauban was appointed of its honorary members; and Fontenelle observes t no one better deserved this distinction, since no one d more completely rendered science subservient to the nefit of mankind.

Besides the 'Eloge' by Fontenelle, in his 'Histoire du nouvellement de l'Académie,' we have an account of uban's life in an 'Eloge' by Carnot; and another by Noel in 1790: the former gained the prize proposed the Académie de Dijon in 1783, and the latter that ich was proposed by the Académie Française in 1785.

t is remarkable that little is known of the collateral nches of the family of Vauban: one of his grand- hews was a lieut.-general and governor of Bethune; the son of this officer, after having served in America ler Rochambeau, and subsequently in La Vendée, died Paris in 1816.

AUCHER, JEAN PIERRE, professor of histori- theology at Geneva. Although a preacher and a cher of theology, he is better known for his works on any. Alphonse de Candolle, in a notice of the life and tings of Vaucher, attributes his love of natural history irectly to his possession of the chair of historical theo- y. For he says, 'the recital of so much strife caused unintelligible questions, of so many wars and persecu- ns brought about by theological dogmas, was likely to duce this effect upon an upright and enlightened man.' e first work on botany published by Vaucher was on family of 'Conferva,' the phenomena of whose sporules cited his attention. This was published at Paris, in 00, and entitled 'Mémoire sur les Grains des Conferves,' . He continued his researches upon the family of nts, to which he had already directed his attention, and, 1803, published his history of fresh-water Confervæ *listoire des Conferves d'Eau Douce*, &c.), a work which s long been held in the highest estimation, and which id the foundation for all subsequent labours in this de- rtment of botany. His remarks on the reproduction and owth of the various species of Confervæ that fell under s observation were correct, nor has much advance been ade in this department of botany since his day. For lthough subsequent algologists have added greatly to the s of species of Algæ, they have done much less towards e elucidation of their functions. Vaucher subsequently rsued his researches on the structure and functions of several of the genera and species of Cryptogamic plants. The result of his observations was published in several papers in the 'Memoirs of the Society of Natural History and Physics of Geneva.' He also published at Paris, in 1827, a work on the structure and functions of the Orobanches, which was illustrated with 15 lithographs of dissections of these plants. In 1828 he published a monograph on the natural order Equisetaceæ. Although his published observations on plants up to this time had been for the most part confined to the lower orders, he had all his life been more or less preparing for a great work on the physiology of plants in general. The first part of this work was published in 1830, but finding that the plan on which he had commenced it was too extensive, he deferred any further publication of the work till it was completed in 1841, when it appeared at Paris, in 4 vols. 8vo., entitled 'Histoire Physiologique des Plantes d'Europe, ou Exposition des Phenomènes qu'elles présentent dans les diverses Périodes de leur Développement.' He received the first complete copy of this work on his death-bed, and he employed the few remaining days that his strength permitted in sending some copies to his friends. The work was dedicated to Charles Albert, Prince of Carignano, now king of Sardinia, who was one of his former pupils.

The design and execution of this work are novel. In describing the structure and functions of plants, species, or small groups of species are taken, and are studied independently of other plants, for the purpose of arriving at their individual peculiarities. His leading idea in the observations contained in this work is, that the species, genera, and families of plants have distinctive physiological as well as structural characters. The labour required for this work was immense, and only a long life could have enabled him to do it; but it was with Vaucher a labour of love, and he appears to have pursued it without regard to fame or reward. His observations are of course confined to plants which he had observed in a living state, and which could only comprehend a small portion of the vegetable kingdom. His general views in this work are not always free from error, nor is his terminology so correct as is required at the present day; but whatever may be the faultiness of his generalizations, or want of accuracy in the use of terms, there is every reason to believe, from the correctness of his former observations, that this work is entitled to the confidence of the botanist. The short time that this work has been published will not permit us to speak more positively: already some of his views have excited attention amongst botanists on the Continent; and Alphonse de Candolle, whilst he differs from Vaucher in some of his conclusions, places the utmost confidence in the accuracy of his observations. Many parts of the work too were finished when botany was much less advanced than at the present day, and consequently display deficient knowledge of modern observation. Vaucher, with De Saussure and others, was one of the founders of the Geneva Society of Natural History and Physics. He died at a very advanced age in the year 1841, beloved and respected by all who knew him. A genus of confervoid plants was named in honour of him 'Vaucheria,' by De Candolle.

(Bischoff, *Lehrbuch der Botanik*; Alphonse de Candolle, *On the Life and Writings of Vaucher*, translated in the 'Annals of Nat. Hist.,' vol. x., from the *Bibliothèque Universelle*.)

VAUCHE'RIA, a genus of plants belonging to the inarticulate Algæ, named after professor Vaucher of Geneva. This genus belongs to the tribe Siphoneæ, and was formed by De Candolle from Vaucher's genus *Ectosperma*. The fronds or filaments are aggregated, tubular, continuous, capillary, and coloured by an internal green coloured mass. The fructification consists of dark green homogeneous vesicles, which are attached to the filaments. The species are found in pools and ditches and stagnant waters, on damp ground, and on the mud of salt-water rivers, and in the sea.

V. dichotoma, large dichotomous Vaucheria, has dichotomous filaments, with solitary, globose, sessile vesicles. This is one of the most common of the species, and is found, in spring and summer, in pools and ditches of fresh water, and Mr. Berkley has found a variety in the sea. It is one of the largest of this genus, its filaments being often more than a foot long, and filling up the ditches on account of their number.

V. Dillwynii, Dillwyn's Vaucheria, has branched, flexuose filaments, with globose, lateral, sessile vesicles. This species is common on the ground in damp situations, forming a thin intricate fleece of a green colour.

V. clavata, clubbed Vaucheria, has short filaments terminating with a vesicle, which contain the sporules. This species does not appear to be an inhabitant of Great Britain. It inhabits ditches of clear water, and is interesting on account of the observations made upon it by Unger. Whilst examining this plant, he found that the vesicular summits had the power of contraction, and that by this process they expelled the contained sporules, which after their expulsion ascended to the surface of the water. 'As I continued my observation,' says Unger, 'I happened to look at the surface of the water, and was not a little astonished to find it covered, especially towards the side of the vase, with minute globules, unequal both in colour and size. Many of them swam freely here and there, moving at their option, in one way or another, retiring and approaching one another, gliding round globules that were motionless, stopping and again setting themselves in motion, exactly like animated beings. Conjecturing the identity of the green globules that possessed motion with those that had none, I immediately began to examine whence these infusory animalcules derived their origin, and what relation they bore to the green globule and the fructification of the conferva. The next day I perceived a great number of globules aggregated around the bubbles of gas disengaged from the conferva, and floating at the surface. There were some of them of a dark green colour, and either round or elongated, others more transparent, humid, and with one or two appendages diverging from or at right angles with each other: these were evidently plants in a state of germination; other globules again were oval, very dark at one extremity, and almost transparent at the other; these swam about freely. Within the space of one hour, I succeeded in tracing not only the diminution of vitality and death of the infusoria, but also the subsequent development of the dead animals into germinating plants, in such a manner as to establish the truth of the fact.' (*Mag. of Nat. Hist.*, vol. i.) These curious phenomena have not been observed in other Vaucheriæ, although similar motions have been observed in the sporules of other Confervæ. There are nine species of the genus Vaucheria found in Great Britain.

VAUCLUSE, a department in the south of France, bounded on the north by the department of Drôme, on the east by that of Basses Alpes; on the south by that of Bouches du Rhône, from which it is separated by the Durance; on the west by that of Gard; and on the north-west, for a very short distance, by that of Ardèche: from the last two it is separated by the Rhône. Its form approximates to an oval, having its longer diameter from north-west to south-east, from the bank of the Rhône north of La Palud, to that of the Durance at the junction of the Verdon, 69 miles; and its shorter diameter or breadth, from south-west to north-east, from the junction of the Durance with the Rhône below Avignon, to the border of the department of Drôme, 38 miles. It is comprehended between 43° 38′ and 44° 27′ N. lat., and between 4° 40′ and 5° 46′ E. long. The area is estimated at 1345 square miles, which is not much above half of the average area of the French departments, and is just about equal to the area of the English county of Salop: the population in 1826 was 233,048; in 1831, 239,113; and in 1836, 246,071, showing an increase in the last five years of 6958, or between 2·5 and 3 per cent., and giving 183 inhabitants to a square mile. In amount of population it falls very far short of the average of the departments, but in density of population it exceeds them; and in both amount and density of population exceeds the English county with which we have compared it. Avignon, the chief town, is 356 miles in a direct line south-south-east of Paris, or 432 miles by the road through Sens, Auxerre, Lyon, Valence, and Orange; in 43° 57′ N. lat. and 4° 48′ E. long.

The eastern side of the department is mountainous: the mountains of Lure, which separate the department of Hautes Alpes from that of Drôme, enter this department on the north-east side, where they rise to the height of about 5500 feet, and are connected with Mont Ventoux, which has an elevation of 6423 feet above the level of the sea. This eastern side of the department is occupied by the secondary geological formations which intervene between the cretaceous and carboniferous groups. The western and south-western sides, where the hills subside, and plains extend along the banks of the Rhône and the Durance, are occupied by the tertiary formations. The mineral wealth of the department is not great. There are two pits for lignite, of which one is worked, and yielded in 1834, 4131 tons, valued at 5*s*. 4*d*. per ton: it gave employment to 21 workmen. There was at the same time one furnace for smelting iron. Potters' clay is abundant, and there are plaster-pits, limestone-quarries, and quarries of excellent freestone. Peat is found, but is not dug for fuel. There are several mineral springs, but none of any note.

The department belongs wholly to the basin of the Rhône, which flows along its western boundary, as its tributary the Durance does along the southern. The Rhône is the only navigable river; for the Durance has too rapid a current, and a channel too much obstructed with sand to be navigable. Large rafts are formed of the timber floated down the stream from the well-wooded district about its upper waters; and the produce of the country is sometimes transmitted on these rafts to the neighbourhood of Avignon. The other rivers of the department are the Lez, which belongs partly to the department of Drôme, the Aigues, and the Sorgues (with its affluents the Nesque, the Auzon, and the Ouvèze or Auvaise), all three tributaries of the Rhône; and the Caulon or Calavon and the Lèze, tributaries of the Durance. The length of the navigation of the Rhône belonging to this department is estimated at about 34 or 35 miles. There are no navigable canals, but a number of canals for the purpose of irrigation.

The fountain or spring of Vaucluse, to which the verses and letters of Petrarch have given celebrity [Petrarca, Francesco], and from which the department takes its name, is the source of the Sorgues: it rises in a cavern in the secluded valley of Vaucluse ('vallis clausa') midway between Apt and Avignon. The spring is sufficiently copious to form at once a stream capable of bearing a boat. In the immediate vicinity of the fountain a column was erected in 1809 by the 'Académie de Vaucluse' of Avignon; it bears in gilt letters the simple inscription 'à Pétrarque' ('to Petrarch'). Not far distant from the fountain is the village of Vaucluse, in which Petrarch lived; and between the village and the fountain is an old castle or mansion, formerly belonging to the bishops of Cavaillon, in which the poet frequently resided, and which has derived from that circumstance the name of 'Petrarch's Castle.'

The number of 'routes royales,' or government roads, on 1st January, 1837, was four, having an aggregate length as follows:—in repair, 22 miles; out of repair, 11; unfinished, 23;—total, 56. The principal road is that from Paris and Lyon to Aix and Marseille, which enters the department on the north side near La Palud, and passes through Mondragon, Mornas, Piolene, Orange, Courthézon, Bedarrides, Sorgues, and Avignon: this is a first-class road. A second-class road, crossing the Rhône at Le Pont St. Esprit, passes through the northern portion of the department by Bollène, and enters the department of Drôme: it then crosses that of Hautes Alpes, and runs by Mont Genèvre to Turin. The departmental roads had, at the same period, an aggregate length of 291 miles, namely, 171 miles in repair, 90 out of repair, and 30 unfinished.

The climate is on the whole temperate and healthy. The variations of the weather are however rapid; tempests are frequent, and the hail is often destructive to vegetation. Occasionally there are years marked by extreme and long-continued drought.

The area of the department may be given in round numbers at 860,000 acres; of which about 390,000 acres, or nearly one-half, are under the plough: but from the poorness of the soil the produce in grain is not sufficient for the consumption of the department: of the corn grown, rye and barley form an unusually large proportion. The meadow-lands are not extensive, they occupy only about 15,000 acres; but the heaths and open pastures amount to about 170,000 acres. There are numerous flocks of sheep, but of a very inferior breed. The ass and the mule are much employed in agricultural labour. The vineyards occupy an area of 70,000 acres: the wine produced is generally deep-coloured and heady, but of inferior quality, and not suited for exportation. The best are the red wines of Côteau-brulé, Châteauneuf, and Sorgues. The orchards and garden-grounds occupy 14,000 acres: the department lds abundance of olives, almonds, and walnuts; good ars, peaches, plums, apricots, figs, and melons. Saffron, dder, artichokes, anise, coriander, fustic, the yellow ain of Avignon (the produce of a species of buckthorn), d the evergreen oak are cultivated. The silkworm is tensively reared, and honey and wax are abundant. e woodlands occupy above 150,000 acres.

The department is divided into four arrondissements, as lows:—

ondissement.	Situation.	Area in Square Miles.	Cantons.	Communes.	Population. 1831.	1836.
ignon . .	S.W.	192	5	20	65,946	69,820
t. . . .	S.E.	450	5	50	55,245	56,109
rpentras .	Central and N.E.	326	5	30	51,269	52,699
nge . .	N. and N.W.	377	7	84	66,653	67,143
		1345	22	143	239,113	246,071

In the arrondissement of Avignon are the following wns:—Avignon, population in 1831, 25,956 for the wn, or 29,889 for the whole commune; in 1836, 31,786 r the commune [Avignon], on the Rhone; Courthézon, p. 2235 for the town, or 3053 for the whole commune; édarides, pop. 1895 for the town, or 2215 for the whole mmune; and Sorgues, pop. 1884 for the town, or 2518 r the whole commune—all on the road from Paris to Avignon; Cavaillon, pop. 3845 for the town, or 6911 for the whole mmune [Cavaillon], on the Durance; and Thor, and sle or L'Ile, pop. 4717 for the town, or 6052 for the whole mmune, on the Sorgues. Courthézon or Courthéson is a alled town, and has in its vicinity a lake of salt water, on e banks of which maritime plants grow: yet the nearest rt of the Mediterranean is not less than 44 or 45 miles stant. There are no fish in the lake. Bédarides or Bédarrides is on the Ouvèze, over which there is a good idge; and Sorgues is on the Sorgues, from which it has s name: Sorgues is walled; and there are two towers maining of an old castle of the popes: there are a paper-ill and a madder-manufactory: trade is carried on in ine and brandy. Lisle or L'Ile is on an island of the orgues: it was originally a hamlet inhabited by fishermen, but became important from having been made by the nhabitants of some neighbouring towns a place of refuge rom the brigands who then infested the country. The wnsmen manufacture woollen yarn, blankets, woollen uffs, silk, and leather; and trade in silk, oil, wine, and adder: they have four yearly fairs for horses, mules, eep, silk, and manufactured goods.

In the arrondissement of Apt are the following:—Apt, opulation in 1831, 4315 for the town, or 5707 for the hole commune; in 1836, 5958 for the commune [Apt], n the Calavon or Caulon; St. Saturnin, Gordes, and oignac, to the north of that river; Menerbes, Bonieux, aignon, and Cacuron, between the Caulon and the urance; and Cadenet, pop. 2280 for the town, or 2595 r the whole commune, and Pertuis, pop. 3764 for the own, or 4520 for the whole commune, on or near the urance. Gordes has four yearly fairs for cattle and hardwares. At Pertuis, woollen yarn, brandy, and earthenware are made; and there is a commercial tribunal.

In the arrondissment of Carpentras are—Carpentras, pop. in 1831, 6294 for the town, or 9817 for the whole commune; in 1836, 9224 for the commune [Carpentras], on he Auzon; Monteux, pop. 2106 for the town, or 4760 for he whole commune; Mazan, pop. 2670 for the town, or 851 for the whole commune; and Mourmoiron or Mormoiron, pop. 1506 for the town, or 2097 for the whole commune, on the same river; Sarrians; Caromb, pop. 2238 for the town, or 2552 for the whole commune; and Beloin, on affluents of the Ouvèze; and Pernes, pop. 3264 for the town, or 4593 for the whole commune; Venesque, and Sault—all three on the Nesque. Monteux has a madder-mill. Mazan has the ruins of some Roman buildings, and a number of pleasant country-houses. Mormoiron is walled, and has narrow gloomy streets: the principal houses are outside of the walls: it is in a pleasant country. Sarrians is n the midst of a silk-growing district; Caromb in a wine, il, and pulse district: there is a strong castle in the latter own. Venesque or Venasque has a very antient Church, which has been commonly, but erroneously, supposed to have been a temple of Diana. At Pernes trade is carried on in silk, oil, and saffron. It was the native place of the celebrated preacher Fléchier. Sault is in too elevated a site to admit of the cultivation of the olive; but the mulberry is cultivated, and a great number of silkworms are reared in the vicinity: the distillation of scented waters is carried on in the town.

In the arrondissement of Orange are—Orange, pop. in 1831, 6211 for the town, or 9123 for the whole commune; in 1836, 8874 for the commune [Orange]; La Palud, Mont-dragon, Mornas, and Piolene, on the road from Paris to Avignon; Bollène, pop. 2779 for the town, or 4672 for the whole commune, on the Lez; Valréas, pop. 2883 for the town, or 4348 for the whole commune, on the Corronne, a feeder of the Lez; Vaison, on the Ouvèze; Malaucène, pop. 2209 for the town, or 3069 for the whole commune, between the Ouvèze and the Auzon; and Caderouse, pop. 1911 for the town, or 3169 for the whole commune; and Châteauneuf, on the Rhône. La Palud is a small town, walled, situated at some distance from the Rhône, but liable to injury from the overflowing of that river. Mont-dragon, Mornas, and Piolene or Piolenc, are small walled towns of nearly the same size, and each commanded by a limestone rock surmounted by a ruined castle. It was from the rock of Mornas that the ferocious Des Adrets forced his prisoners to leap, in the religious wars of the sixteenth century. In or near Piolene, coal (or perhaps lignite), jet, and pipe-clay were or are dug; some silk is thrown; and considerable trade in corn, wine, fruit, and silk is carried on. Bollène is built on the slope of a hill: the townsmen are engaged in throwing silk and in dyeing. Numerous remains of antiquity have been dug up near the town. Valréas or Vauréas was the birth-place of Cardinal Maury. Vaison has an antient bridge over the Ouvèze, of one arch and of considerable width, evidently of Roman construction; the remains of an amphitheatre; an antient temple, believed to have been sacred to Diana, and afterwards converted into a chapel; some remains of a quay-wall along the bank of the river, and various other fragments of Roman buildings; and an antient cathedral, some portions of which are probably as old as the tenth century, with a cloister. Mosaic pavements have been discovered in the neighbourhood of the town. Vaison was the Vasio of the Romans. It was plundered several times by the barbarians who overran the Western Empire; and was afterwards ruined by Raymond VI., Count of Toulouse, towards the end of the twelfth century. Malaucène has silk-mills, oil-mills, copper-works, and a paper-mill. Caderousse or Caderousse, has silk-mills, and is in the midst of a country productive in wheat, silk, and madder. Near Châteauneuf, distinguished as Châteauneuf du Pape, some of the best wine in the department is made.

The population of the towns, where not otherwise described, is from the census of 1831.

The department constitutes the metropolitan diocese of Avignon; the archbishop of which has for his suffragans the bishops of Nîmes, Valence, Viviers, and Montpellier. It is in the jurisdiction of the Cour Royale of Nîmes; and under the superintendence of the Académie Universitaire of the same city. It contains a Protestant Consistory; and has resident in it a considerable number of Jews. It is included in the eighth military division, of which the head-quarters are at Marseille, and sends four members to the Chamber of Deputies. In respect of education, it is a little below the average of the departments of France. Of the young men enrolled in the military census for 1828-29, 37 in every 100 could read and write: the average of the departments being between 39 and 40.

In the most antient period the greater part of the department was included in the territory of the Cavari (Καούαροι, Strabo; Καύαροι, Ptolemy), or Cavares (Pliny and Mela); some parts on the northern border, adjacent to the Rhône (the Rhodanus of the Romans, and Ῥοδανός of the Greeks), were included in the limits of the Tricastini (Τρικαστινοί, Ptolemy); and some parts of the north-eastern border, round Vaison, in those of the Vocontii (Οὐοκόντιοι, Strabo and Ptolemy). Some of the south-eastern parts belonged to the Memini (Μήμινοι, Ptolemy) and the Vulgientes. All these, so far as we learn, were Celtic nations. The Tricastini are mentioned by Livy in his account of the emigration of the Gauls into Italy under Bellovesus (lib. v., c. 34), and again in his description of the march of Hannibal (lib. xxi., c. 31). Polybius however does not mention them. Strabo does not mention either the Tricastini, Vulgientes, or Memini; he probably comprehends them in his description of the Cavari, whose name he tells us had been extended to the other Celtic tribes in their neighbourhood: perh they had become subject to the Cavari. The Cavari (we understand the name to be used in an extended sense) were remarkable for having in a great degree, in Strabo's time, adopted the Roman language and mode of living. The Durance was known to the antients by the name Druentia (Δρουεντία, Strabo). Strabo, in a passage evidently corrupted, speaks (as we understand the passage) of two rivers surrounding a city of the Cavari and flowing with united stream into the Rhône; but these rivers can hardly be identified. He also mentions another stream, the Sulgas (Σούλγας), now the Sorgues, which, he says, joins the Rhône at the city Undalum (Οὔνδαλον), or, as we should perhaps read, Vindalum (Οὐίνδαλον); the town being evidently the same as the Vindalium of Livy (*Epitome*, lib. lxi.) and Orosius (lib. v., c. 13); and the river with the Vindelicus or Vindalicus amnis of Florus (lib. iii., c. 2).

The following Roman towns were comprehended in the department: Avenio (Ἀουεννιών, Ptolemy), now Avignon; Arausio (Ἀραυσιών, Ptolemy), now Orange; Cabellio (Καβελλιών, Ptolemy), now Cavaillon; Vasio (Οὐασιών, Ptolemy), now Vaison; Carpentoracte, now Carpentras; Vindalium; Apta Julia, now Apt; and perhaps Æria (Ἀερία, Strabo), and Forum Neronis. Of these, Arausio (called Secundanorum from its having been colonized by soldiers of the second legion) was a Roman colony; Avenio and Cabellio (in Ptolemy's time, for according to Pliny they were only Latin towns) were also Roman colonies; these three were in the territory of the Cavari: Vasio, which was in the territory of the Vocontii; Carpentoracte, which Pliny assigns to the Memini; Apta Julia, which belonged to the Vulgientes; and Æria, were Latin towns. Vindalium was at or very near the junction of the Sorgues with the Rhône; but the exact position of this town and of Forum Neronis is not agreed upon. Strabo says that the position of Æria, being on a very lofty site, well accorded with its name. D'Anville suggests that it was upon Mont Ventoux, which is perhaps right. Forum Neronis was in the country of the Memini; and if Pliny is correct in assigning Carpentoracte to that people, Forum Neronis was probably near that town, if not identical with it, as some have supposed. D'Anville however, who doubts the correctness of Pliny, proposes to identify Forum Neronis with Forcalquier; for no other reason than the very insufficient one that the name of this town embodies the syllable For—a relic of Forum. One of the many positions termed in the 'Itinerary' of Antoninus and the Peutinger Table 'Fines,' or 'borders,' was in this department, between Cavaillon and Apt.

Under the Romans this department was included in the province of Narbonensis; and, on the subdivision of this, partly in Viennensis, partly in Narbonensis Secunda. It afterwards passed to the Burgundians, Franks, Ostrogoths, and again to the Franks; and in the middle ages the greater part of it was included in the counties of Avignon and Venaissin [COMTAT D'AVIGNON, LE, and LE COMTAT VENAISSIN] and the principality of Orange. [ORANGE.] The counties of Avignon and Venaissin were properly parts of Provence, but belonged to the pope until 1791, when they were annexed to France. The principality of Orange was included in Dauphiné, and belonged to the family of Nassau, until the death of William III., prince of Orange and king of England. It then came to the king of Prussia, by whom it was ceded to France.

(Malte-Brun, *Géographie;* Millin, *Voyage dans les Départemens du Midi de la France;* Vaysse de Villiers, *Itinéraire Descriptif de la France;* D'Anville, *Notice de l'Ancienne Gaule;* Bouquet, *Récueil des Historiens des Gaules et de la France*; *Dictionnaire Géographique Universel.*)

VAUD, CANTON DE, called also 'Pays de Vaud' ('Waadt,' in German), a canton of Western Switzerland, is bounded on the north partly by the canton of Neuchâtel and partly by France, from which it is separated by the chain of the Jura Mountains; on the east by the cantons of Freyburg, Bern, and the Valais; south by the Lake Leman, which separates it from Savoy; and west by France and the canton of Geneva. The area is vaguely said to be about 1200 square miles; and the population is about 184,000 inhabitants, who belong to the Reformed or Evangelical communion, with the exception of about 3000 Roman Catholics, chiefly in the district of Echallens. The central part of the canton is traversed from east to west by a succession of heights and table-land known by the name of Jorat, which seems to connect the Jura with the Alps, and which divides the waters that flow northwards into the lake of Neuchâtel and the Aar from those which run southwards into the Lake Leman and the Rhône. The southern part of the Canton de Vaud, which slopes to the shores of the lake, is one of the finest regions of Central Europe. The vine is planted in terraces along the slopes of the hills, and its cultivation employs above 20,000 persons. The best wines are those of La Vaux, between Lausanne and Vevey, and of La Côte, between Aubonne and Nyon. They are white wines, and capable of keeping for a number of years. The Canton de Vaud is essentially agricultural: the highlands of the Jura and those of the Alps on the east towards the borders of Bern feed considerable herds of cattle. In 1835 there were in the canton about 70,000 head of large cattle, 64,000 sheep, 17,000 goats, 22,000 horses, and 20,000 pigs. Corn is not produced in sufficient quantity for the consumption of the population. The cultivation of potatoes has been greatly increased within the last twenty years. Fruit-trees are abundant, and the forests cover large tracts. There are no manufactures of any great importance; those that exist are chiefly for the supply of the internal consumption.

The principal towns of the canton are—1, LAUSANNE; 2, Vevay, 12 miles east of Lausanne, in a beautiful situation on the banks of the lake, has a handsome church, a college, a public library, and about 5000 inhabitants, who carry on a considerable trade. Vevay is better built and easier of access than Lausanne, and is a very picturesque residence. To the east of Vevay is the castle of Chillon, on which Lord Byron has written a poem. Farther eastward in the valley of the Rhône are Aigle, a small town at the entrance of the romantic valley of Ormonts. The wine d'Yvorne, made in its neighbourhood, is much esteemed; and BEX, with its salt-mines. West of Lausanne, along the shore of the lake, is a succession of picturesque small towns, Morges, Rolle, Nyon, Coppet, and higher up the hill Aubonne. In the northern part of the canton is Yverdon, on the lake of Neuchâtel, with a castle in which Pestalozzi established his school, an institution for the deaf and dumb, and about 3000 inhabitants. In the interior of the canton are Moudon, with 2350 inhabitants and a college, and Payerne on the river Broye, an affluent of the lake of Neuchâtel, with 2700 inhabitants. Orbe, at the foot of the Jura, on the road from Lausanne to Paris by Besançon, has about 1900 inhabitants. The high valley of the Orbe with the romantic lake of Joux, in the Jura mountains, is a most interesting district in the summer season. Watchmaking, cutlery, and iron-works are carried on in this remote district.

The Canton of the Vaud forms an important part of the Swisse Romande, called also Suisse Française, because the common people speak Romance pâtois or dialects, and the educated people speak French. The Suisse Romande comprises Vaud, Neuchâtel, part of Freyburg, the Lower Valais, and Geneva. The people of German Switzerland in common discourse designate the whole by the name of Wälschland. These countries formed part of the ancient kingdom of Burgundy, having been occupied by the Burgundians as early as the fourth century.

The Pays de Vaud was conquered about the middle of the thirteenth century by Peter, count of Savoy, and was annexed to the dominions of that house as a great fief, which was given in appanage to a branch, with the title of barony of Vaud. In 1359 the barony reverted to Amadeus VI., count of Savoy, by a cession made by Catherine, the heiress of the barons of Vaud. The country was parcelled out among a number of feudal lords, vassals of the house of Savoy, such as the lords of Granson, Aubonne, Blonay, and Cossonay, the domanial towns which were directly subject to the house of Savoy, such as Moudon, Yverdon, Nyon, and Morges, the bishop of Lausanne, who held jurisdiction over several districts, and the municipal town of Lausanne, which enjoyed considerable franchises. The Pays de Vaud had states or assemblies of the clergy, the nobility, and the deputies of the towns, which used to meet generally at Moudon; but the history of those assemblies, their prerogatives, and form of proceeding is very obscure, and has given rise to much controversy. They seem to have been in some respects subordinate to the states of Savoy, just as the representative assemblies of the British colonies are subordinate to the imperial parliament.

In 1476, when Charles the Rash, duke of Burgundy, in- aded Switzerland, James of Savoy, count of Romont, who overned the Pays de Vaud during the minority of his ephew duke Philibert I., joined his troops with those of harles. The consequence was that the Bernese and their onfederates, having defeated Charles at Granson and Iorat, overran the Pays de Vaud, took and pillaged Lausanne, and finally detached the eastern districts of Bex, ligle, and Ormonts, which were incorporated with Bern, nd those of Morat, Granson, and Orbe, which were ad- ninistered as common bailiwicks subject to both Bern and reyburg.

In the following century Duke Charles III. of Savoy aving attacked Geneva, the ally of Bern and Freyburg, he latter sent troops to the assistance of Geneva, and at ength a treaty was concluded at St. Julien in 1530, by hich the duke promised to respect the independence of eneva, and it was stipulated between the parties that if he duke broke the treaty he should forfeit the Pays de aud. Six years after, the duke again laid siege to eneva, and the Bernese invaded the Pays de Vaud; some owns, such as Rolle, Nyon, and Coppet, opened their gates illingly to them; others attempted to resist, the bishop f Lausanne ran away, and finally the whole Pays de Vaud ecame subject to Bern. About this time Farel, Viret, Ialler, and others preached the doctrines of the Reforma- on in Western Switzerland; Bern embraced them, and e Pays de Vaud followed the example. The see of Lau- nne was abolished.

In 1539, by an order from the Bernese government, the ench language was substituted for the Latin in all iblic acts. In 1564 Emmanuel Philibert, duke of Savoy, nounced by a treaty all his claims on the Pays de Vaud, hich was to retain the privileges and franchises which it ijoyed under the house of Savoy. Charles IX. of France ted as mediator, and guaranteed this treaty. Among e privileges and franchises the assembly of the states as implicitly included. But the elements of those ntient states existed no longer. In consequence of the eformation the bishops and abbots were gone; the feudal ords had likewise lost their political jurisdiction by the ernese conquest, and the subsequent uniform system of dministration which was established; and the states were o longer convoked. This however was made the pretence, oout two centuries and a half afterwards, for the armed terference of the French republicans in the affairs of vitzerland.

The Pays de Vaud was divided for the purpose of lministration into fifteen bailliwicks, the baillis, or gover- rs, of which were appointed by the government of Bern. veral of the old noble families were inscribed among the itricians of Bern, and thus obtained a share in the vernment of the whole canton. All the rest of the pulation were subjects of Bern. But the communes d their own councils, and appointed their local officers d magistrates; the taxes were few, and the Bernese aillis were generally honest and equitable. Personal rvitude was abolished in 1678, but feudal rights and fees ere continued, and in the following century the govern- ient of Bern made several useful reforms in the adminis- ation of the laws. High roads were also constructed, and griculture was encouraged. The Bernese administration the Pays de Vaud could not be called oppressive, ut it was absolute, and inclined to keep things sta- onary. Discontent existed not so much in the mass of e population, as among individuals of the educated lasses, who could not bear the idea of being subjects f the Bernese. The difference of language between the overnors and the governed contributed to embitter the feud. he breaking out of the great French revolution encouraged e malcontents. Bern used coercive measures: several idividuals were imprisoned, and others escaped to Paris, here they formed clubs, and corresponded with the dis- ffected at home. They applied to the French executive irectory, which eagerly seized the opportunity of meddling the affairs of Switzerland. The nickname of aristocrat, pplied indiscriminately right or wrong, was then in bad epute, and Bern was decidedly an aristocratic govern- nent. At last, in 1798, the directory imperiously required Bern to restore the Pays de Vaud to its independence, and his in the name of the old guarantee of King Charles IX. Ieantime popular assemblies were formed in the Pays de 'aud, being countenanced by a strong body of French troops assembled along the frontier. The council of Bern acted with indecision, the French troops entered the Pays de Vaud, and that fine country was lost to Bern for ever. It is a fact still remembered at Lausanne, that when the French soldiers entered that town, so little did they know whom they were marching against, that they asked the citizens where did their lord (seigneur) live, that they might settle their business with him. The invasion of the Pays de Vaud led to that of Bern, and the overthrow of the Bernese government altogether. [BERN, CANTON OF.]

After a series of vicissitudes during the ephemeral governments set up in Switzerland by the French, the Pays de Vaud was constituted as a sovereign canton or state of the Swiss confederation, and acknowledged as such by Bonaparte's Act of Mediation, in 1803. All feudal rights were abolished, civil equality was proclaimed, and a representative government was established. The canton was divided into circles; the electors in each circle appointed three deputies, with a property qualification, to the great council or legislative assembly. The great council appointed the members of the executive and of the high courts of justice.

Napoleon being overthrown in 1814, the Act of Mediation fell with him. The old cantons, and Bern among the rest, put forth their claims to the former subject bailliwicks; the head towns of the cantons assumed their former rights over the country districts, and the aristocratic families claimed again the monopoly of offices. All was again confusion in Switzerland, when the ministers of the allied powers invited all the Swiss cantons, without distinction of old and new, to frame a new federal compact, and at the same time recommended them to revise their respective constitutions, so as to take a middle course between aristocracy and democracy, and reconcile, if possible, popularity with stability. The old town cantons gave a share in the representation to the inhabitants of the country, retaining however a majority of seats for the deputies of the head towns. As for the new cantons, such as Vaud, Aargau, Thurgau, and Ticino, they had no chief town of importance, and no old aristocratic families to conciliate; but the framers of the new constitutions contrived a curious machinery in order to check all democratic tendency. The mode of election was made triple; one-third of the members of the legislature continued to be elected direct by the circle assemblies as before. These assemblies also presented a list of four candidates for each circle, having a higher property qualification than the direct members, out of which list the great council selected one deputy, and thus another third of the seats was filled. Lastly, an electoral commission, consisting of the members of the council of state, or executive, of the high court of appeal, and of a certain number of members of the great council, chose the remaining third of the new members chiefly from amongst the wealthier landed proprietors, and a few from among men of learning, without any property qualification. The members of the executive, and of the supreme judiciary court, were appointed by the great council from among its own members, who retained, after their appointment, their seats in the legislature. The right called 'of the initiative,' or of proposing laws, belonged exclusively to the executive. A project of law, laid by the council of state before the great council, could be accepted or rejected, but not amended. Such was the frame of the government of the Canton de Vaud, and such, with few differences of detail, was that of the new or 'popular' cantons, as they styled themselves, in opposition to the old aristocratic or town cantons. The only real distinction however was, that the aristocracy of the old cantons was one of principle and privilege, recognised as such, while the aristrocracy of the new cantons was that of a set of men who, while professing to claim no exclusive rights, contrived to perpetuate themselves and their friends in power. Dissatisfaction however existed, but did not break out openly till 1830. In May of that year, before the events of Paris, the assemblies of the communes of the canton Ticino demanded a reform in the constitution, and obtained it without any serious disturbance. This example, and the Paris revolution of July, 1830, encouraged the people of the other cantons to do the same. The respective councils of state demurred, and took time, and this occasioned popular tumults in several places. In the Canton de Vaud several thousand countrymen, excited by leaders of the higher class, but arme with sticks only, repaired to Lausanne, to oblige the council of state to convoke the assemblies of circles, for the purpose of appointing deputies to frame a new constitution. The council yielded, and the men returned home quietly. A 'constituante,' or national assembly, was convened, which framed a new constitution on the principles of equality of political rights and rotation of office, without any property qualification, which constitution was laid before the primary or communal assemblies, in June, 1830, and accepted. The members of the great council, or legislature, are elected by the assemblies of circles, one for each thousand inhabitants. All citizens of the canton, being bourgeois of a commune, who have completed twenty-three years of age, and are neither bankrupts nor paupers, nor interdicted, are possessed of the elective franchise. The members of the legislature are elected for five years. Candidates for seats must be twenty-five years old, citizens of the canton, and have their domicile in it.

The great council meets twice a year for about a month each time: its members receive a remuneration. It appoints the members of the executive, and those of the courts of justice. The canton is divided for administrative purposes into twenty-one prefectships: Aigle, Aubonne, Avenches, Cossonay, Echallens, Granson, Lausanne, La Vallée, Lavaux, Morges, Moudon, Nyon, Orbe, Oron, Payerne, Pays d'Enhaut, Rolle, Vevay, Yverdon, Ormonts, and Ste. Croix. The public revenue amounts to about 1,600,000 Swiss francs, or 100,000*l.* sterling. The principal sources of revenue are the land-tax, conveyance and legacy duties, stamps, monopoly of salt and gunpowder, licenses, duty upon the sale of wine and other liquors, post-office, duty upon horses and dogs, customs, which are very moderate, and the forests and other domains, and capital belonging to the state. The principal items of expenditure are: General administration, 126,000 Swiss francs; judiciary and police, 133,000; church and clergy (the established religion is the Helvetic communion), 249,000; public instruction, 101,000; roads, 301,000; military, 217,000; gendarmerie (a body of 200 men, with their officers), 88,000; charitable establishments, 40,000; besides minor objects.

All natives or bourgeois of a commune of the Canton de Vaud, or of other parts of Switzerland, having their domicile in the canton, are inscribed on the military registers from the age of sixteen to forty. Active duty begins at twenty, first in the 'élite' for eight years, after which the men are placed on the lists of the reserve. The regiments of élite are the first to be called out in cases of emergency, besides which they are regularly exercised and encamped at certain times of the year.

The civil code of the Canton de Vaud is mainly framed upon that of France. A new penal code, as well as a code of procedure in criminal cases, have been published and enforced of late years. Trials are public. There is no jury; the judge decides both the fact and the law.

Much has been done since 1830 for public instruction. There are primary schools in every commune, middle schools, or schools of industry, colleges, and lastly the 'Académie' of Lausanne, a sort of university college, with fifteen professors and four 'auditoires,' theology, law, philosophy, and belles-lettres. The 'école normale,' or school for masters, founded in 1833, has effected much good. A sensible and modest report by the director of this institution, which may be read with advantage by the promoters of education in any country, was published in 1839: 'De l'Ecole Normale du Canton de Vaud, depuis sa fondation jusqu'à aujourd'hui, par L. F. Gauthey, Pasteur, Directeur de cet établissement,' Lausanne, Mai, 1839.

The charitable institutions are numerous: most communes have a purse for the relief of their indigent inhabitants, besides which there are no less than eighty private charitable establishments in various parts of the cantons. Subscriptions for the poor are also frequent, especially in the winter season; committees of ladies and gentlemen, who visit the poor 'à domicile,' exist in most towns. There is much pauperism in the country, owing to various causes, such as the uncertainty of the vintage, which forms the staple harvest of a large portion of the canton; the habit of drinking among the men; and a certain indolence and improvidence, which is characteristic of the people.

Upon the whole the Canton de Vaud is one of the most interesting and beautiful cantons of Switzerland, and is one of those which has gained most, and lost least by the political vicissitudes of the last half-century. There is a spirit of moral activity at work there, which promises well; and the situation of the country, the subdivision of property, the absence of large towns and their populace, the good temper of the people, all these render the experiment of a democratic government less hazardous than in countries differently situated. For population, extent, and influence, the Canton de Vaud ranks the first in Romande or French Switzerland. Society at Lausanne and Vevay is as refined as in any European capital. A great revival of religious and moral feeling has also taken place in the canton, though partially, within the last ten years.

(Lereschc, *Dictionnaire Géographique Statistique de la Suisse*; Descombaz, *Soirées du Village, ou Entretiens sur l'Histoire du Canton de Vaud et sur ses Institutions*, Lausanne, 1838; Olivier, *Le Canton de Vaud*; and an article in the 'Foreign Quarterly Review,' No. xvii., January, 1832, on the *Political State of Switzerland*, which gives a concise, but clear account of the internal political changes which have taken place in Switzerland since 1798.)

VAUDEVILLE. Aval, or à-vau, is a phrase among navigators, implying the reverse of amont. Avau de l'eau is used adverbially to express drifting down a stream:—'Personne ne ramoit, nous nous laissions aller à-vau l'eau.' Vaudeville appears originally to have been applied to designate any song or ballad borne along on the current of town gossip or popularity—'à-vau de ville.' It has been customary among etymologists to maintain that the word was originally vau-de-vire, from the valley of Vire in Normandy, 'where gay and malicious songs were composed centuries ago, which had great currency.' No evidence has ever been adduced in support of this legend, and the kind of rhymes originally designated by the term vaudeville are quite as likely to have originated in populous towns and their gossiping crowds, as in a Norman valley. 'Vaudeville,' we read in the 'Dictionnaire de l'Académie,' 'signifies a popular song, the air of which is easily caught, and the words composed upon some story of the day.' From songs the term was extended to pamphlets and theatrical pieces founded on ephemeral gossip:—'C'est un vaudeville, une pièce à vaudeville.' At present the theatrical application of the name appears likely to supersede the others. Theatrically speaking, a vaudeville is a short drama, the dialogues of which are interspersed with short songs set to popular airs. The principal charm of the vaudeville consists in its covert allusions, its delicate raillery on the leading characters and events of the time. The plot ought to be simple—rather sketched or indicated than developed—and the characters presented in the same slight manner. The interest ought never to be sufficiently serious to divert attention from the interchange of playful sarcasm and simple melodies which all can appreciate. The vaudeville charms by its brilliant and easy dialogue, its snatches of apparently impromptu music and song, and its least possible spice of malice: any attempt to give a show of reality to the story and persons of the drama would render the elegant trifle ponderous and stupid. It is an odour, or a flavour devoid of substance. Hitherto French authors alone (with perhaps the exception of Göthe) have succeeded in composing, and French actors in representing, these charming nothings: the graceful levity of the vaudeville can scarcely ever bear translation into the more sinewy languages of Europe; and English, German, or even Italian actors are all too much in earnest to act it properly. Among all French authors of vaudeville, the palm is undoubtedly due to Scribe of the thousand dramas.

VAUDOIS ('Waldenses,' or 'Valdenses;' in Latin 'Vallesi;' 'Valdési' in Italian; 'Vaudés' in their own dialect), a remarkable people, who form a community separate from the church of Rome, and who live in the high valleys of Piedmont, on the eastern or Italian side of the Cottian Alps, between Mount Viso and the Col de Sestrieres, in the province of Pinerolo. The valleys are:—1, that of Lucerna, through which flows the Pelice, an alpine torrent which rises in the Col de la Croix, near Mount Viso, and, flowing eastward, falls into the main Clusone; 2, Valley of Perosa, through which passes the Clusone, which rises in the Col de Sestrieres, flows in a south-east direction by Fenestrelle, Perosa, and near Pinerolo, and, after receiving the Pelice, joins the Po a few miles farther down; 3, Valley of San Martino, which branches out of the valley of the Clusone, along the course f a torrent called Germanasca, which rises in the Col 'Alides. Of these three valleys, the southernmost, that of ucerna, is tolerably productive: gardens and vineyards, rchards, corn-fields, and pastures are seen in pleasant ıccession; but the other valleys are ill favoured by nature. he inhabitants grow some corn and maize: they have ıeep, goats, and cattle, but not many horses. Silkworms re reared in some places, and silk is made. The farmers re mostly métayers, that is to say, they pay to the landwner half the produce of the ground, either in kind or ioney. Most of the peasantry have with their cottages a w roods of land of their own: some are possessed of a w acres. Fuel they obtain from the forests in the mounains. Their cottages are of a very humble description. he three valleys together comprise an area of about 2 miles in length from north to south, and 18 miles in idth from east to west, confined between the right bank f the Clusone and the left bank of the Pelice. The popuation amounted, according to Serristori's 'Statistica,' in 835, to 20,523 individuals of the antient Vaudois communion, besides about 1700 Roman Catholics scattered about the various communes, mostly strangers, who are arrying on some trade. The Vaudois are distributed in hirteen parishes, each having its pastor, called 'barbe' in heir dialect. One of the pastors bears the title of moderator, being superior in authority to the rest. In former imes, when the Vaudois communion was much more xtended than it is now, they had bishops, who are ıentioned in several old documents. The principal villages are:—La Torre, in the valley of the Pelice, or ucerna, with about 2000 inhabitants; San Giovanni, ngrogna, Bobbio, and Villaro, in the same valley; Poıaretto, in the valley of the Clusone; San Martino, Villaecca, and Perera, in the valley of the Germanasca, or San fartino. In every parish there is a church and a school, esides a Catholic church for the Roman Catholic populaion. Formerly there was a college at Angrogna, where andidates for ordination received their instruction; but t has long since been demolished, and its funds have been eized, and students are obliged to go to Geneva or Lauanne in Switzerland, where they are examined and ordained. ngland, the Protestant cantons of Switzerland, the Netherands, the king of Prussia, and the emperor of Russia, have t various times contributed, by subscription or annual rants, towards the support of the Vaudois pastors and ıeir schools. The Sardinian government allows them 500 ancs a year to each pastor. As it is, the pastors have little ore than 1000 francs a year, with the use of the humble resbytery or parsonage-house. The Vaudois clergy are lowed to marry. They take no fees for burials, baptisms, marriages. The Liturgy now in use is that of Geneva, the French language: formerly they made use of a iturgy in Italian. The spoken dialect of the people esembles the other dialects of Piedmont. The origin of e name Valdenses, or Valdesi, is found in the word vallis, d means inhabitants of the valleys. Its derivation from eter Waldo, or Valdo, of Lyon, a merchant of the twelfth ntury who was a religious reformer, caused portions of e Bible to be translated into French, and was the founder f the sect called the Poor Men of Lyon, is now abandoned. aldo being condemned by the archbishop of that city, A.D. 172, and afterwards by Pope Alexander III., emigrated Germany, and is sadi to have died in Bohemia. The audois of Piedmont however existed as a religious comunity long before Waldo, whom Beza even suspects of aving derived his tenets, if not his name, from them. rom him however the separatists from Rome in the south f France have been called Waldenses, and this has caused ıem to be confounded with the Vaudois, or Vaudés, of e Alps, although the doctrines and discipline of some of e former were not always in accordance with those of e Vaudois. The real Vaudois remained in the valleys st and west of the Cottian Alps. The Albigenses proerly so called were quite distinct from the Vaudois. ALBIGENSES.]

This little community is remarkable for having kept self from time immemorial separate from the Church of ome, in ages when that church is generally considered having been the only existing church in the West, and being the only Italian church which continues to this y separate from Rome. We have memorials of the ctrines of the Vaudois written in the early part of the elfth century: their tenets were then such as they are now. The 'Nobla Leyçon,' a poem in the Vaudés dialect, nearly the same as that which is spoken at the present time, records in the text its having been composed in the early part of the twelfth century. We give here the beginning of the poem, retaining the old orthography, with its contractions, as found in a very antient copy on parchment which is preserved in the university library at Geneva:—

> 'O frayres, entēde una nobla lenzon;
> Sovēt devē velhar erstar en ōson.
> C'nos veyē āqst mōt car ps del chavō.
> Mot curios d'oriā esser d'bnās obās far,
> C'nos veyē āqst mōt dela fin apprar.
> Ben ha mil ceñt ānus upli enterment
> Que fo septa lora car sen al derrē tēp.'

The translation of which is—

> 'O brethren, hear a noble lesson;
> We ought often to watch and pray,
> For we see this world is near its end.
> We ought to be earnest in doing good works,
> For we see this world is approaching to its end.
> Eleven hundred years are fully completed
> Since it was written, "The end of all things is at hand."'

The last sentence, whether it alludes to the passage in *Acts*, ii. 17, or to the passages of a similar tenour in *St. Paul's Second Epistle to Timothy*, and the *Epistle to the Hebrews*, in the *Epistles of St. Peter*, or, lastly, to the *First Epistle of St. John*, ii. 18; still it points to an epoch within the apostolical times, and therefore the period of eleven hundred years from that fixes the date of the 'Nobla Leyçon' to within the first half of the twelfth century or thereabouts. The text goes on to say that it was 'easy to see the sign of the accomplishment of the prophecy in the increase of evil and the decrease of good, in the perils which the evangelists and St. Paul have mentioned,' &c. The poem is a sort of abridgment of the history and doctrine of the Old and New Testaments: it speaks of the mission of the apostles and of the primitive church, and of certain practices that were introduced afterwards in its bosom; of simony, the institution of masses and prayers for the dead, of absolution, and other tenets of the Church of Rome, which it rejects. In one place it speaks with censure of the practices of 'all the popes which have been, from Sylvester to the present time;' and in another it says—'Now after the apostles were certain teachers who went on teaching the way of Jesus Christ our Saviour, some of whom are found at this present day, but they are known to a very few:' and after describing the life and conversation of such teachers, the text proceeds—'Such a one is called a Vaudés.'

There is also a confession of faith of the Valdenses, bearing date A.D. 1120, acknowledging the apostle's creed and the canonical books of the Old and New Testaments, recognising no other mediator and advocate with God the Father but Jesus Christ, denying purgatory, admitting only two sacraments, Baptism and the Lord's Supper, as signs or visible forms of the invisible grace, discarding the feasts and vigils of saints, the abstinence from flesh on certain days, the mass, &c. And another MS. dated 1100, speaks of the Valdenses as having maintained the same doctrines from time immemorial in continued descent from father to son, even from the times of the Apostles. Besides these, there are two controversial treatises, one entitled 'Of Antichrist,' and the other upon 'The Invocation of Saints,' which seem to bear this internal evidence of their antiquity, that in enumerating the various tenets and practices of the Roman church which the Valdenses reject, they speak of the doctrine of the real presence, and of the adoration of the Virgin Mary and the Saints, but in so doing they do not use the words transubstantiation and canonization. Now the term transubstantiation was first introduced under Pope Innocent III., and confirmed in the council of Lateran, A.D. 1215, and the first Papal Bull in which the word canonization occurs is dated 1165. Nor do these treatises speak of the devotional exercise of the Rosary introduced by St. Dominic, nor of the Inquisition, which began in the thirteenth century. Had those institutions existed when the treatises were written, they could hardly have escaped the notice of the writer. MS. copies of these and other antient documents relative to the Vaudois, amounting to 21 volumes, were brought to England by Sir Samuel Morland, who was sent by the Protector Cromwell as envoy to the Duke of Savoy in 1655, and were by him presented, in 1658, to the library of the university of Cambridge. Morland wrote a 'History of the Evangelical Churches of the Valleys of Piedmont,' London, 1658, giving a transcript and English translation of the

Nobla Leyçon.' P. Allix, D.D., who published 'Remarks upon the Ecclesiastical History of the Antient Churches of Piedmont,' in 1690, notices the MSS. brought by Morland. But now only 14 out of the 21 volumes are existing in the university library, and nobody can tell what is become of the rest. The 'Nobla Leyçon' is one of those which are missing. In 1669, Jean Leger, a pastor of the Valdenses, published at Leyden, 'Histoire Générale des Eglises Evangéliques des Valleés du Piémont,' in two books, the first of which treats of the early date and continuity of their doctrine, and he gives transcripts of several of the MSS. brought to England by Morland.

The question about the early date of the 'Nobla Leyçon,' the Vaudois confession, and the other MSS. abovementioned, is of considerable importance in an historical as well as religious point of view. There is however further evidence brought forth for the antiquity of the Vaudois doctrines. The name of Valdenses does not appear in historical records till the end of the twelfth or early part of the thirteenth century, but we find allusions as early as the ninth century to the existence of non-conformist churches on the borders of Italy. Jonas, bishop of Orleans, in his work 'De Cultu Imaginum,' addressed to Charles the Bald, A.D. 840, speaks of Italian churches which he accuses of heterodoxy because they refused to worship images, and he charges Claudius, bishop of Turin, with encouraging the people of his diocese in their separation from the Catholic unity.

The fragments existing of the works of Claudius show his opinions concerning faith and merits, prayers after death, the worship of images, the invocation of saints, tradition, and church authority, to have been the same as are expressed in both the old and modern Vaudois catechisms, as well as in the catechisms of the modern Reformed churches. And it is worthy of remark, that Claudius in his epistle 'Ad Theodemirum,' says, in reply to the charge of promulgating novelty in religion: 'I teach no new sect, but keep myself to the pure truth, and I will persist in opposing to the uttermost all superstitions and schisms.' Claudius died about A.D. 840, and contemporary with him Agobardus, bishop of Lyon, as appears by his 'Treatise against Pictures,' edited by S. Baluze, was also preaching against the worship of images. The valleys of the Cottian Alps must have been under one or the other of these bishops. In the synod held at Arras, A.D. 1025, it was represented to the president, Bishop Gerard, that certain persons had come from the borders of Italy and had introduced heretical dogmas about the nature of justification, the real presence, and against images, relics, altars, &c. About 1140 Bernard of Clairvaux, in his 66th sermon upon the Canticles, speaking of heretics who then were disturbing the church, mentions, among others, 'a sect which calls itself after no man's name, which affects to be in the direct line of apostolical succession, and rustic and unlearned though it is, yet it contends that we are wrong and that it only is right. It must derive its origin from the devil, since there is no other extraction which we can assign to it.' The Valdenses have always rejected any distinctive sectarian appellation, and have boasted of adhering from age to age to the primitive faith. In the bull of Pope Lucius, A.D. 1183, four years after the Lateran council, in which the Albigenses were anathematized, several sorts of heretics are mentioned. Cathari, Paterini, the poor men of Lyon, and the Passagini, or men of the passes, as lying under a perpetual anathema. And in 1194, Alfonso, king of Aragon and marquis of Provence, issued an edict, 'commanding the Valdenses, the Insabbatati, who otherwise are called the poor men of Lyon, and all other heretics to depart out of his dominions.' About 1230 Reinerus, a Dominican, who states that he had been himself a heretic, wrote a treatise against heretics, 'Opusculum de Hæreticis,' in which he speaks, among others, of the Leonists, or Poor Men of Lyon ('Secta Pauperum de Lugduno qui etiam Leonistæ dicuntur'), and describes their tenets, which are exactly the same as those contained in the old records of the Valdenses as well as in their modern catechisms. The Valdenses and the Poor Men of Lyon (Valdenses sive Lugdunenses) are confounded together in the chronicles of that age; and in the Chronicon of Abbas Ursbergensis, A.D. 1212, the Pauperes de Lugduno are represented as an antient order which arose in Italy long ago. Reinerus begins by saying, that these Leonists or Pauperes were the most pernicious of all the sects, for three reasons—1, Because they are the most antient, more antient than the Manichæans or Arians, dating their origin, according to some, from the time of Pope Sylvester I., and according to others from the time of the Apostles. 2, Because they are more universally spread. 3, Because they have the character of being pious and virtuous, as they believe in the Apostles' creed, and are guilty of no other crime than that of blasphemy against the Roman church and clergy. He also says that, 'in all the states of Lombardy and Provence the heretics have more schools than the theologians and more auditors; they hold public disputations and convoke the people to solemn discussions . . . they have translated the Old and New Testaments into vulgar tongues. I myself have seen and heard a clownish layman who could repeat the whole of the book of Job by heart, and many who were perfectly acquainted with the whole of the New Testament. . . . They reject whatsoever is taught if it is not demonstrable by a text in the New Testament.' And then he goes on enumerating many places where the heretics have churches and schools: all which shows that dissent was very widely spread in North Italy and the south of France in the thirteenth century, and it corroborates the traditions of the Valdenses, that their doctrines spread at one time over many districts on both sides of the Alps. This book of Reinerus is very important, but we must refer those who wish for further information to the Rev. W. S. Gilly's *Second Visit to the Vaudois of Piedmont*, 1831, section iii., where the author has placed in parallel columns passages from Reiner's text, the corresponding opinions of Italian writers previous to the twelfth century, and those of the antient and modern Valdenses concerning the same topics.

When Marcus Aurelius Rorenco, grand-prior of St. Roch, was sent by duke Charles Emmanuel, about the middle of the seventeenth century, to make inquiries concerning the Vaudois, he reported that 'these Apostolicals, as they call themselves, were of an origin of which nothing certain could be said, furthermore than that Bishop Claudius might have detached them from the church in the eighth century, and that they were not a new sect in the ninth and tenth centuries.' And the monk Belvidere, who went to the valleys of the Cottian Alps on a similar inquiry, reported 'that heretics have been found in the valley of Angrogna in all periods of history.' Claude Seissel, archbishop of Turin, A.D. 1500, spoke of them as 'the Vaudois sect, which originated with one Leon, a devout man in the time of Constantine the Great.' From all the above testimonies, it is contended, with considerable show of argument, by the Vaudois, that they are not a sect that sprang up in the twelfth century, or was introduced by emigrants from abroad, but that they are an aboriginal Alpine community, the offspring of early Christianity implanted in these remote districts. The earlier edicts of the dukes of Savoy speak of the 'men of the valleys' and their 'antient faith,' which 'it had been found impossible to eradicate from thence, and which the dukes had been constrained to tolerate.' An edict of 1584 speaks of privileges granted by former dukes, and cites edicts of 1448 and 1452. In the 'Theatrum Statuum R. C. Sabaudiæ Ducis,' published in 1682, it is stated that treaties 400 years old secured personal and religious freedom to the Vaudois.

It is an historical fact that, some time in the fourteenth century, a colony of emigrants from north Italy professing the tenets of the Vaudois settled in Calabria, where they cleared the ground of whole districts, and became thriving tenants of the great landlords. They built the town of La Guardia (which is still called Guardia Lombarda), San Sisto, La Rocca, and others, not far from Cosenza, where they lived in peace and unnoticed for about three centuries. But after the spreading of the Reformation in the sixteenth century they began to correspond with Geneva and other places, and invited some Protestant divines to come among them. This excited the attention of the local authorities; and the duke of Alcala, viceroy of Naples, sent commissioners and monks with troops to convert or destroy them. They resisted, and were destroyed with circumstances of great barbarity, in 1561. (Botta, *Storia d' Italia*, book x.)

At one time the valleys of the Vaudois were subject to the marquises of Saluzzo; and the Vaudois have repeatedly asserted, without being contradicted, that 'their ancestors professed their antient faith long before the dynasty of Savoy was established in Piedmont.' Their religious community

nded then over many other valleys on both sides of the
to the southward beyond the Po over part of the mar-
e of Saluzzo, westwards in the valley of the Durance
as Embrun and Briançon, and northwards to the
of the Dora. The valleys of Queiras and Frassiniere
ance, and that of Pragelà in the province of Susa, at
oot of Mount Genèvre, professed their communion till
in comparatively recent times. In the two former
eys there are still scattered evangelical congregations,
he villages of Dormilleuse, Frassiniere, and Violin,
h were visited by Mr. Gilly in 1829; but in the
y of Pragelà, subject to the Piedmontese government,
issenting church is allowed.

oncerning the persecutions which the Vaudois have
ained, and which fill up a large portion of their his-
. we must not trust implicitly either to Leger and the
r Vaudois writers, who were themselves actors or
erers in these occurrences, nor to the accounts of their
ecutors. We prefer following a modern historian,
ta, a Piedmontese and a Roman Catholic, but a tem-
ate, discriminating writer, far removed from those
es of strife, and from the passions which excited them
ere the consequence of them. The earlier persecu-
s of the Vaudois were the work of the inquisitors sent
Rome. Pope John XXII. issued a bull against them
332. Walter Lollard, who was burnt at Cologne in
, was a Vaudois clergyman. About the year 1400 a
ecution is recorded against the inhabitants of Pragelà
the valley of Perosa, in which many perished. In
Innocent VIII. issued a bull to Alberto de Capitaneis,
l nuncio and commissioner for the dominions of the
of Savoy on both sides of the mountains, enjoining
to extirpate the pernicious sect of malignant men
d the "poor people of Lyon," or the Waldenses, who
long endeavoured in Piedmont and other neighbour-
parts to ensnare the sheep belonging unto God, under a
ned pretence of holiness,' &c., and if expedient 'to preach
crusade against them.' But it was not until the follow-
century that a general proscription took place. When
her, Zwingli, and Calvin began preaching their re-
med doctrines, the Valdenses acknowledged them to be
lar to their own. Francis I. of France, who was also pos-
ed of Piedmont, persecuted all heretics indiscriminately,
ther of the new Reformed faith, or of the old Waldensis
audois communion, and determined on extirpating
n. The massacres of Dauphiné and Provence, espe-
y at Merindol and Cabriere, are recorded in history. He
e same time wrote to the parliament of Turin, enjoin-
it to enforce religious conformity within its jurisdiction.
Vaudois of Piedmont then drew up a list of their ar-
s of faith and laid it before king Francis, begging to
allowed to retain their antient form of worship; to
h Francis replied, that as he was putting to death the
tics in France, he could not tolerate them on the other
of the Alps. The parliament of Turin commanded
Vaudois to drive away their barbes, or pastors, and to
ive Roman Catholic priests, who would be sent to in-
ct them. The Vaudois refused, and persecution followed.
eral Vaudois who refused to renounce their faith were
ed alive. (Botta, b. iv.: A.D. 1541-4.) Still their
munion was not extirpated; and, years after, Pied-
t having been restored to the house of Savoy, duke
manuel Philibert, after being repeatedly urged by the
isitor Giacomello, sent by pope Paul IV., ordered, in
, the Vaudois to attend the Roman Catholic service,
forbade them the exercise of their own form of wor-
under penalty of 100 golden 'scudi' for the first
sgression, and of the perpetual galleys in case of
pse. The Vaudois wrote an humble supplication with
apology for their faith to the duke, who, being little
versant with theological controversy, proposed a con-
nce between the Vaudois and Roman Catholic divines.
pope Paul IV. disapproved of this; and at last, being
ortuned by the inquisitor and the nuncio, and the
t of Spain, the duke resorted to arms to enforce
dience. He sent into the valleys 7000 men under the
nt of La Trinità, to whom the French king joined two
ments on the side of France. The French court at
time was persecuting the Huguenots, who were nu-
tous in Dauphiny, and who were disposed to make
mon cause with the Vaudois. The Vaudois defended
mselves bravely, and in one instance defeated the ducal
ops at Pra di Torre. Many atrocities were committed in this desultory warfare, and women and children were not spared. Some of the prisoners were burnt alive at Carignano, Susa, and Pinerolo. At last duke Emmanuel Philibert, disgusted with this war, into which he had been pressed against his wish, and urged by the intercession of his wife, Margaret of France, who pitied the Vaudois, granted them, in June, 1561, peace and an amnesty, with the exercise of their religion, within certain stated limits, in the valleys of Lucerna and San Martino, on condition that the Roman Catholic service should also be performed simultaneously in churches appropriated to the purpose in the various villages. This edict was signed by Philip of Savoy, lord of Racconigi on one part, and by two of the principal pastors of the Vaudois on the other. The court of Rome and the monks in Piedmont declaimed loudly against these concessions of duke Emmanuel Philibert, and almost called him a heretic. (Botta, b. x.) There is in the appendix to Gilly's 'First Excursion among the Vaudois' a translation of a letter of Scipio Lentulus, a Neapolitan emigrant on account of religion, who had taken shelter in the valleys of Piedmont, relating the occurrences of the war of 1561.

In 1601 and 1602 Charles Emmanuel I. confirmed to the Vaudois their religious immunities, but the Inquisition was molesting them at the same time, and even imprisoned some individuals, and when remonstrances were made to the ducal ministers, they replied, 'These matters do not concern his highness.' (Botta, b. xv.) The duke however issued two rescripts, dated 1603 and 1620, guaranteeing to the Vaudois the exercise of their religion within the limits prescribed in the three valleys of Lucerna, Perosa, and S. Martino. The Vaudois had asked the same favour for their coreligionists in the Marquisate of Saluzzo, but this was refused. Charles I. of England sent twice an embassy to the duke to intercede for the Vaudois, in 1627 and 1629. (*Appendix to* Gilly's *First Excursion to the Mountains of Piedmont in* 1823.)

Victor Amadeus I., who succeeded Charles Emmanuel, published an edict enjoining the non-conformists of the Marquisate of Saluzzo, who were chiefly in the communes of Paesana, Praviglielmo, Bioleto, Bretonni, and Croezzo, to embrace the Roman Catholic religion, under penalty of death and confiscation of property; and this edict was so strictly enforced, that not one non-conformist remained in those parts. But at the same time the duke issued an edict to protect the Vaudois of the valleys of Pinerolo, who have always been held distinct from the others, and to check the prevailing practice among the Roman Catholic priests and laity of kidnapping the children of the Vaudois in order to bring them up in the Roman faith. (Botta, b. xxi.) After the death of Victor Amadeus, and during the civil war which raged in Piedmont, the Vaudois remained faithful to their lawful duke, and opposed by arms the factious marquises of Lucerna and Angrogna, who sided with Prince Thomas and the other pretenders to the Regency, and they were accordingly confirmed in their privileges by the Duchess Regent, and by the young Duke Charles Emmanuel II. But the same Charles Emmanuel afterwards directed a most fierce persecution against the Vaudois. Botta attributes the origin of this fresh storm to the turbulent disposition of Jean Leger, a pastor of some name among the Valdenses, who had more zeal than prudence. In March, 1653, the inhabitants of Villaro, in the valley of Lucerna, rose in a tumult, and drove away the Capuchins from their convent, to which they set fire. The ducal troops repaired to the spot, and, after some bloodshed, peace was re-established. But this affair led to further investigations, when the ducal government found out that the Vaudois had transgressed against their engagements by purchasing property and establishing schools and places of worship beyond the limits fixed by former edicts. In January, 1655, the duke caused his auditor Andrea Gastaldo to proceed to Lucerna, when he issued a manifesto ordering all Vaudois families to evacuate within three days the communes of Lucerna, San Giovanni, La Torre, Bibbiana, Fenile, Campiglione, Bricherasco, and San Secondo in the lower part of the valley of the Pelice, and retire to the higher part of the valley, to the communes of Villaro, Bobbio, Rorà, Angrogna, and Boneti. Within twenty days they were either to sell their property situated in the former districts or to embrace the Roman Catholic faith. The Vaudois resisted this command, and the duke sent the marquis of Pianezza with a body of regulars and some militia in the following April. The Vaudois deserted their villages, carrying their provisions to the mountains. The marquis followed them there, but he could not subdue them; and his soldiers, finding nothing to eat, withdrew. The Vaudois then issuing from their recesses, under two determined leaders, Jayer and Janavel, fell upon several Roman Catholic villages, and plundered and burnt them. They then entered La Torre, but being surprised by Pianezza, they fought desperately and most of them fell, but not without killing numbers of the ducal troops. In this warfare cruelties were committed by both parties, but the Vaudois, being the losing party, were, with their families, the greatest sufferers. Many atrocities were committed against the women and children by the Piedmontese soldiers, but still more by the mercenary French and Irish soldiers in the service of the duke, which horrors Jean Leger, who was an actor in the struggle, has detailed at length, and, Botta thinks, has exaggerated, in his 'Narrative.' But there is a document in the University library at Cambridge which tells strongly against the marquis of Pianezza himself. It is a declaration by Captain Du Petit Bourg, who was serving in a French corps under Pianezza, protesting against the cruelties which he saw committed, and for which he retired and quitted his corps. He says that the marquis ordered to give no quarter, saying that his highness was determined to have none of their religion in his dominions. This protest, a copy of which is given by Gilly in his first work, is dated Pinerolo, 25th November, 1655, and is attested by other officers. It appears however that Pianezza ordered the women and children to be spared, and he rescued many from the hands of the brutal soldiers, and distributed them in the neighbouring districts of Piedmont. A number of Vaudois took refuge across the mountains in the French valley of Queiras, and returned after the fury of the massacre had abated. Others perished in the snow, and others lurked for a time in the recesses of the mountains, under their chief Janavel, who carried on a partisan warfare until he was killed some years after.

The news of the massacre of the Vaudois spread far and wide throughout Europe. The Protestant cantons of Switzerland, the Protector Cromwell, and the States of Holland, sent envoys to the duke of Savoy, to remonstrate in favour of the Vaudois. Cromwell sent Sir Samuel Morland, who collected numerous documents, and published them in his 'History of the Evangelical Churches,' fol., 1658. Cromwell's Latin letters to the duke and other princes on the subject were written by Milton, who in one of his sonnets has feelingly lamented the cruelties committed against the Vaudois. Subscriptions were made in England and other countries for the survivors. At last, at Cromwell's request, Louis XIV. offered his mediation, which the duke accepted, and a convention was concluded in August of the same year, 1655, at Pinerolo, which then belonged to France, by which a general amnesty was granted, and the Vaudois were allowed to remain on the left bank of the Pelice within certain fixed boundaries, and to have the exercise of their religion, but at the same time it was agreed that the Roman Catholic worship should be performed in the same villages, and Catholic missionaries be sent to preach there, but no Vaudois should be constrained to become a Roman Catholic, and no girl under ten, and no boy under twelve years of age, should be taken from their parents. This convention was signed by Jean Leger and other Vaudois pastors. But after some years new complaints and disputes broke out, which Count Bagnolo, the governor of the province, wanted to settle in an arbitrary manner. Fresh resistance and a new persecution took place in 1663 and 1664, followed by a new edict of the duke, by which the Vaudois were forbidden performing their worship in the village of S. Giovanni. Jean Leger emigrated, and visited various countries, urging the claims of the Vaudois and collecting subscriptions for them. He was at last appointed minister of the Walloon Church at Leyden, where he died. (Botta, b. xxv.)

Victor Amadeus II. succeeded Charles Emmanuel, and took the reins of government at the end of 1684, being then eighteen years of age. Piedmont was then the humble ally of the imperious Louis XIV., who about this time resolved to abolish Protestantism in France by the revocation of the Edit de Nantes, and he ordered Victor Amadeus to do the same with regard to the Vaudois. After some demur the duke was induced to submit, and in January, 1686, he issued an edict ordering the Vaudo to abjure their tenets within fifteen days or leave country. Driven to despair, the Vaudois determined resist. They were attacked on one side by the troops, and on the other by those of Louis XIV., manded by Catinat. After a gallant struggle the V were overpowered, and the survivors were obliged t mit unconditionally. Their whole property was cated, and given to Roman Catholic colonists, the habitants with their families taking their departu Switzerland. Those who had been taken prisoners distributed in various prisons, in which a number of died. At the end of six months there were 3000 left, at the intercession of the Protestant ambassadors at were released, and followed the rest to Switzerland, they met with kind hospitality. At the expi three years, a band of 800 of these emigrants, unde command of one of their pastors, Henry Arnaud, took one of the most daring and romantic expeditions attempted by men. In August, 1689, Arnaud and assembled secretly between Rolle and Nyor in the Vaud, seized some boats, crossed the Leman lake, at Yvoire in Savoy, marched across Savoy by Cl Sallenche before troops could be assembled against then crossing a high offset of the Alps, descended valley of the Isere, and from thence over Mont C the banks of the Dora above Susa, where they forced way through a body of French troops which dispute passage, and found themselves once more on the bo their native district. French garrisons mixed with montese troops occupied the valley of Lucerne; crossed the Col di Giuliano, driving the enemy befo and took Bobbio, which was plundered. But fresh being sent against them, the Vaudois turned into th nesses of the valley of San Martino, and carried on a p warfare during the whole winter until the following 1690, when, luckily for the Vaudois, an open rupture place between Louis XIV. and Victor Amadeus, wh mediately issued an edict of amnesty to the Vaudo full leave to all those who had emigrated to return homes, with the free exercise of their religion as He released those who were still in prison, and had clothed and furnished with other necessaries, and them that it was the king of France who had been author of their calamities. It is more than suspe the court of Turin, foreseeing the rupture with Fra not oppose the return of Arnaud's column so strenu it might. In the war that followed, the Vaudo among the best defenders of Piedmont against the Victor Amadeus himself at one time took refuge valleys, and after the victory of Turin, in 1706, he ledged their services in a proclamation. (Botta, xxxii.) Arnaud has written an account of his exp entitled 'Histoire de la glorieuse Rentrée des Vaudo leurs Vallées,' 1710, which he dedicated to Queen England. This book is become very scarce.

In 1713, by an agreement between Louis XIV. Victor Amadeus, the valley of Pragelà on the uppe was given up to the latter in exchange for the Barcelonetta, and it was made a condition by Lou the Roman Catholic religion should be exclusively forced in that valley. Accordingly Victor Amade 1721 forbade their religious meetings, and ordered have their children brought up in the Catholic nion. Remonstrances were made by the English but to no effect, and the valley of Pragelà, in which were once six Vaudois churches, has not retained a family of that communion.

This was the last persecution against the Vaudois, however remained subject to various disabilities and posed to several vexations, which are detailed by Gil his first excursion, p. 116, and in the second, p. 546 We have heard it stated, though we cannot say how that some of those disabilities have been since remove the present king, Carlo Alberto, especially that which cluded the Vaudois from bearing officers' commissions army, although they were bound to serve as private sol

In the wars of the French revolution the Vaudo mained loyal to their sovereign, and bravely defende years the mountain-passes through which the Fre threatened to invade the valley of the Po, which ultima they reached, but not on this side. In June, 1794, K Victor Amadeus III. published an ordinance, in whi acknowledging the constant and distinguished proofs ir attachment and fidelity, he promised to redress l grievances, among others, that of taking away of en of the Vaudois, with the view of obliging them to ce the Roman Catholic religion. He forbade the ce, and ordered those who had been so taken away restored. 'Those who at the prescribed age, girls at id boys at twelve, voluntarily enter the hospital of olo, must be under the direction of ecclesiastical s; but no difficulty will be made in permitting the ts to see their children under proper precautions.'

ien Bonaparte annexed Piedmont to France, he d the Vaudois on a footing of equality with their n Catholic countrymen, and assigned funds for the rt of their clergy. At the restoration in 1814 the ois were again placed under their former disabilities, hose who had purchased land beyond the limits of valleys were obliged to sell it to Roman Catholics. Charles Felix, who succeeded to the throne in 1821, ed some more indulgence towards the Vaudois: he them permission to purchase a house and land in the nune of La Torre for the establishment of an hospital e sick, the disabled, and the aged of their population. noney required was raised by subscriptions in Eng- Prussia, Holland, Switzerland, and other countries. emperor Alexander of Russia contributed 4000 francs. mmar-school has also been established at Pomaretto, another at La Torre. In short, things look a little tter for the poor inoffensive Vaudois, whose moral cter, peculiar position, and prospects have been ex- ed in a very interesting aspect by several English tra- rs since the peace, especially by the Rev. W. S. Gilly.

AULTS. [TOMBS.]

AUQUELIN, NICOLAS-LOUIS, a distinguished ich analytical chemist, was born about the middle of last century, of parents in an humble station in Nor- dy. Fourcroy, accidentally meeting with him, was so ch pleased with his quickness and integrity, that he k him to Paris and made him superintendent of his oratory, in which he speedily became an expert experi- nter, and on many occasions which were acknowledged, l probably on some which were not, he performed ex- iments published by Fourcroy.

le was a professor of chemistry in Paris, and eventually ame chemist to the School of Mines, and a member he Institute. He was extremely industrious, and has lished many memoirs on mineral, vegetable, and animal ysis: in performing his varied researches, he not only roved the methods of analysis previously in use, but discovered some elementary bodies, of which the f and most remarkable were chromium, existing in the lead of Siberia, as an acid combined with oxide of , and glucina, a new earth, or rather metallic oxide, ch he found in the emerald and beryl. The discovery hromium has been of vast importance to the arts; for ing been since found in enormous quantity combined i iron, and in various parts of the earth, it has been ensively used in the state of oxide for giving a green ur to porcelain, and chromic acid combined with oxide lead, forming chromate of lead, is a fine yellow pig- it.

auquelin died in 1829, at an advanced age: his cha- er and conduct were most excellent and exemplary, he passed through the bloody stages of the French olution uncontaminated by its violence or vices.

AUVILLIERS, JEAN FRANÇOIS, a French scholar, born, in 1737, at Noyers in Burgundy, and received a eful education from his father Jean Vauvilliers, a olar of considerable merit. Jean François had scarcely shed his studies when he was appointed one of the rarians of the Royal Library at Paris, and in 1766 he came professor of Greek in the Collège de France. After ving distinguished himself by several works on Greek erature and history, he was elected, in 1782, a member of e Academy of Inscriptions. The storm of the Revolution rried him away from his learned pursuits. He was suc- ssively president of the quarter of St. Geneviève at ris, first 'député suppléant' of Paris in the assembly of e états généraux, president of the communauté, lieute- nt to the maire of Paris, and lastly, 'prévôt des mar- ands,' in which capacity he had the care of the pro- sions necessary for the supply of the capital. The people Paris at that time believed that it was the secret intention of the court to starve them, and they opposed by armed force the export of provisions from the capital into the provinces. Vauvilliers acted in these cases with great energy, and he more than once succeeded in making the mob desist from their predatory disturbances. In his political opinions he was rather royalist; he supported the proposition of Brissot for the abolition of slavery in the colonies, but he also defended the rights of the Roman Catholic church. When he was summoned to take the oath of allegiance to the new democratic system, Vauvilliers declined taking it, laid down his professorship in the Collège de France, and afterwards justified himself in a pamphlet, 'Questions sur les Sermens, en particulier sur celui de Haine à la Royauté.' He was arrested by order of the revolutionary committee, but he obtained his liberation, and then became a member of the council of the Five Hundred. He published several pamphlets on political questions, and expressed his opinions with so little reserve, that he was at last sentenced to deportation, in September, 1797. However he escaped to Switzerland, and afterwards went to Russia, whither he was invited by the emperor Paul. The Academy of Sciences of St. Petersburg elected Vauvilliers a member. He died at St. Petersburg on the 23rd of July, 1801.

Vauvilliers is the author of numerous works and treatises, partly on Greek literature, and partly on modern politics, legislation, and administration. The most important among them are, 1, 'Essais sur Pindare, contenant une Traduction de quelques Odes de ce Poëte,' &c., Paris, 1772, 12mo.; 2, 'Examen Historique et Politique du Gouvernement de Sparte,' Paris, 1769, 12mo.; 3, A number of papers concerning the MSS. of Pindar, Æschylus, and Sophocles, in the 'Notices et Extraits;' 4, An edition of Sophocles, which had been prepared by Capperonnier. It contains some notes and a preface by Vauvilliers, Paris, 1781, 2 vols. 4to. His notes are severely attacked by Brunck; but Harless, in Fabricius's 'Bibliotheca Græca,' speaks highly of their merit.

(Quérard, *La France Littéraire*, where a complete list of his works is given; *Biographie Universelle;* Fabricius, *Biblioth. Græc.*, ii., p. 224.)

VAVASSOR, VALVASSOR, a term applied in the antient records of England, Scotland, France, Lombardy, and Aragon, to persons holding fiefs not immediately under the king or other persons possessing jura regalia (as the duke of Normandy, the earl of Chester, or the bishop of Durham), but under some intermediate lord. It appears also, that to constitute a vavassory, it was necessary that the party should have subordinate freeholders, as vassals holding of his vavassory. (Wilkins, *Leges Angl.*, 247; Bracton, 5 b, 6, 93 b; Ducange.) In England vavassories were generally held by knights' service; but in Normandy, besides the franches vavassories or vavassories nobles, there were socage vavassories held by the rent of a rose, a spur, or a glove, and also *vavassories vilaines.* The possessors of these inferior vavassories were sometimes called 'valvassius.'

Vavassors are twice mentioned in Domesday, pp. 53 and 1469; and in the laws of William the Conqueror, the relief due from a vavassor to his liege lord is described. (Kelham, 40.) A charter of Henry I. directs that pleas of the division of land between the vavassors of two different lords be determined in the county court. In the great Roll of the Pipe of 31 Hen. I., lately published, mention is made of the vavassors belonging to the barony of the archbishop of York. In the laws of Henry II. the jurisdiction of vavassors is specified. Madox (*Baronia Anglicana*, note, p. 135), sets out a writ in which that prince requires the residence or constant attendance of all barons and vavassors, who owe service of castle-guard at Rockingham castle. Francis de Bohun, in the time of Richard I., was seised of two honours, one that of Bohun in Normandy, which he held of the king, as duke *per baroniam*, the other in England, consisting of the manor of Fordes, &c., in Sussex, which he held *in vavasseriâ.* (*Abbrev. Plac., in Domo Cap. Westm.* 88.) In the next reign Alice Briewiere claimed Plimtree in Devon, and Depeworth in Somerset and Dorset, assigned to her by her late husband Roger de Pole, on the day he set out for Jerusalem, for the full third part of three vavassories, viz., for the vavassories of the earl of Salisbury, the earl of Vernon, and of the vavassory of Earl William de Bohun (*Ib.*, 61 b.). In the close rolls of 4 H. III. is a writ to the sheriff of Wiltshire, directing him to give seisin to W. Mandevill, R. Maudut, W. Comyn, and W. de Fontibus of three vavassories of the fee of the Earl of Clare, belonging to the barony of Funtell (Fonthill), which barony Andrew Giffard had, with the assent of King John, resigned to those persons as the right heirs (presumptive) of the barony, reserving the vavassories, which vavassories would appear to have been seized into the king's lands upon the death of Giffard under the advice of the crown lawyers, the council of the minor king being afterwards of opinion that such seizure ought not to have been made. Here, vavassories held of the honour of Clare appear to have become in some way annexed to a barony held of the crown. In the record and process of the renunciation of Richard II., that prince absolves all dukes, marquesses, earls, barons, knights, vassals, and *vavassors*, and other his liege-men, from their oaths of fidelity (3 Rot. Parl., 416); and about the same period Chaucer, after describing his Franklin, says,

> 'Was no where swiche a worthy *vavasour*.'

From this time we lose sight of the English vavassor. Numerous subseigniories however still exist, the owners of which, though not so designated, are in truth vavassors. From the inalienable quality of the Duchy of Cornwall, many manors in Devonshire and Cornwall are held, though the name is no longer continued, as vavassories of the duchy; of which there are many in the former county, holden of the duchy honour of Bradninch.

The breaking up of the old feudal baronies, and the frequent forfeitures incurred by those who held immediately of the crown, brought the great and many of the lesser vavassors into the position of immediate tenants to the crown. But as the extinction of vavassories was gradual, no new class of crown tenants arose, as was the case in Germany where the disappearance of the dukedoms of Suabia and Franconia (caused by the extinction of the House of Hohenstauffen in the person of Conradin, beheaded upon the failure of his attempt to recover the kingdom of Naples from Charles of Anjou), gave rise to a new order in the state, namely, the *immediate* chivalry (noblesse immédiate) of the empire, the reichsritterschaft, a body now *mediatised* by the Congress of Vienna.

When James I., imitating the practice of France, introduced hereditary titles without peerages, a proposal for giving to the new order the designation of vavassors was rejected, and the novel but more appropriate title of BARONET was adopted.

(Terrien, *Cout. de Normandie; Testa de Nevill*, 166 a; Selden's *Titles of Honour*, 513, 520; Cragii *Jus Feud.*, 100, 141; Manning's *Serviens ad Legem*, 185, 291 a.)

VECCHI, GIOVANNI DE', a distinguished Italian painter, born at Borgo San Sepolcro, in 1536. He was the scholar of Raffaellino del Colle, and painted in oil and in fresco. His works are very numerous in the churches of Rome and its vicinity: he made the cartoons for the two great mosaics of the evangelists Luke and John in St. Peter's on the Vatican. He died in 1614. His portrait is in the Academy of St. Luke at Rome. (Baglioni, *Vite di Pittori*, &c.)

VECCHIA, PIETRO, a distinguished painter of the Venetian school, was born at Venice in 1605. He was the scholar of Alessandro Varotari, but painted in a different style. His real name appears to have been Mattoni, and he acquired the name of Vecchia from his ability for imitating and restoring old pictures. Vecchia painted many pictures so exactly in the style of Giorgione, that it is almost impossible to decide between the works of these painters: he painted also some pictures in the styles of Pordenone and Titian. He made the designs of many of the mosaics in the church of San Marco at Venice, but his easel pictures were generally of inferior subjects, and his talent was more for the ludicrous than the serious. Some of his efforts in illustration of the Passion of Christ were signal failures, as regards a proper feeling for the subject. His touch was bold, his drawing and colouring excellent, and some of his effects of light and shade strikingly powerful and masterly. He died at Venice in 1678. (Lanzi, *Storia Pittorica*, &c.)

VECELLIO, TIZIANO, commonly called **TITIAN**, one of the greatest painters of modern times, was born at Capo del Cadore, a small place on the river Piave in the Venetian state, in 1477, or in 1480, according to the most received account. He was of the antient family of Vecellio, of which was San Tiziano, bishop of Uderzo. At the age of about ten young Titian was sent by his father to Venice to an uncle, to be placed with some competent painter. He was first placed with Sebastiano Zuccato, and shortly afterwards with Gentile Bellini, whom however he also soon left for Giovanni his brother, the most eminent painter of his time at Venice. Titian soon surpassed his master. His early works, in themselves extraordinary, are infinitely more so when compared with the works of the leading artists of Venice of his time. His early pictures are finished with remarkable care, drawn in excellent taste, and some of his pictures rival the works of the Dutch and old German artists in finish: there is in the galley of Dresden a picture of the Tribute Money of this description. The great improvement in the works of Titian upon those of Giovanni Bellini and his school was in a great degree derived from the works of Giorgione of Castel Franco, who had appropriated much of the style of Lionardo da Vinci. Giorgione was two years the senior of Titian, and their works were so much alike that they could not always be distinguished; but the merit of introducing the new style into Venice belongs to Giorgione. These two painters were fellow-pupils, and for some time friends, until, upon an occasion when Titian was apprentice or Giorgione employed him, to assist him in some frescoes for the new Fondaco de' Tedeschi (German warehouse), the portion executed by Titian was preferred to that of Giorgione by some of his own friends, and a jealousy arose between them.

At the death of Giovanni Bellini in 1512 Titian was employed by the state to complete a work in the Sala del Gran Consiglio of the Homage of Frederic Barbarossa to Pope Alexander III., which he had left unfinished. Titian completed the picture, but he made many alterations in it; the senate was however so well satisfied with the work, that they presented him with the office of La Senseria with a salary of about 300 crowns per annum, by which he was obliged to paint for eight crowns the portrait of every doge created in his time, to be placed in the palace of St. Mark. He painted by virtue of this place the portraits of Pietro Lando, Francesco Donato, Marcantonio Trevisano, and the Venieri: he was unable to paint the portraits of the last two doges of his time on account of the infirmities of age.

In 1514 Titian painted his Bacchus and Ariadne and other Bacchanalian and similar works in the palace of Alfonso I., duke of Ferrara, which display his extraordinary power of seeing and imitating nature to a remarkable degree. It was upon a door in an apartment of this palace that he painted his celebrated picture of the Tribute Money noticed above: it represents a pharisee showing Christ a piece of money, who appears to be asking him the question, 'Whose is this image and superscription?' The figures are half-length and of the natural size. He painted also at the same time the portrait of the duke with his hand resting upon a cannon, and one of Signora Laura, who afterwards was married to the duke. All these pictures are amongst Titian's finest works: and Michelangelo, when he first saw the duke's portrait, is said to have exclaimed, 'Titian alone is worthy of the name of a painter.' Titian became acquainted at Ferrara with Ariosto, and painted his portrait. The poet compliments the painter in his 'Orlando Furioso' (c. xxxiii. 2):—

> 'Bastiano, Rafael, Tizian, ch'onora
> Non men Cadoro, che quei Venezia e Urbino.'

In 1516, shortly after he returned from Ferrara to Venice, he painted in oil his very celebrated picture of the Assumption of the Virgin, for the great altar of the church of Santa Maria gloriosa de' Frari: it is now in the Academy of the Fine Arts at Venice. This picture is very large, and the figures are larger than life: in the highest part is God the Father between two angels; in the middle the Virgin ascending, accompanied by angels; and in the ground are the twelve apostles witnessing the miracle. It is certainly one of the finest pictures in the world, grand in composition and design, and in colouring wonderful: Titian never surpassed it in these respects by any of his later works, yet he was only thirty-six years of age when he painted it.

This and the works Titian painted at Ferrara so spread his reputation, that he was invited by Leo X. to Rome. Raphael also entreated him to make the journey: the deaths however of the pope and Raphael, in 1521, put an end for a time to the project. He was invited likewise

ıt the same time by Francis I., whose portrait he
ted, to France; an invitation which he showed no dis-
tion to accept.

ı 1528 he painted his celebrated picture of St. Peter
tyr, for the chapel of that saint, in the church of SS.
anni e Paolo. This work has been extravagantly
sed by many critics, both for its arrangement and ex-
ion; the landscape is particularly excellent. Algarotti
it a picture without a fault: its general truth and
arance of reality are not its least remarkable proper-

This picture, as well as the Assumption already
tioned, are painted in a much freer style than Titian's
er works. Aretin wrote in 1536 a letter to Tribolo,
sculptor, in praise of the St. Peter Martyr, by which
earn that this sculptor and Benvenuto Cellini were
ıgly impressed with its extraordinary excellence. It
ll 16½ feet high, by nearly 10 wide, was painted upon
d, but was transferred to canvas by M. Haquin, at
s, in 1799, whither it had been taken with many other
works: it was sent back to Venice in 1815. It has
n engraved by Martin Rota, V. Lefevre, and H. Laurent.
ı consequence of the St. Peter Martyr, Titian received
mmission to paint the Victory of the Venetians' over
Janissaries in the great council-chamber at Venice,
ch was considered the best picture there: it perished
ire, but there is a print of it by Fontana. Another
brated picture which Titian painted about the same
was his St. Sebastian, for the church of San Nicolo de'
i, at Venice, but now in the Vatican at Rome. This
k also has been the subject of much eulogy, especially
ts colouring: it has been engraved by Lefevre.

otwithstanding Titian's great reputation, he lived in a
humble way until he obtained, through his friend
tin, the notice and the patronage of the emperor Charles
In 1530 Charles sent for him to Bologna to paint his
trait: he painted that of Ippolito de' Medici at the same
e, besides portraits of many other distinguished person-
s; and he received also several other commissions from
emperor. Titian went from Bologna to Mantua with
Duke Frederico Gonzaga, for whom he executed many
rks; amongst them eleven of the twelve Cæsars. Do-
tian was painted by Bernardino Campi: they were lost
1630 at the plundering of Mantua, but they have been
en copied. In 1532 Titian went again to Bologna, and
ated the emperor a second time: about this time also
appears to have accompanied Charles into Spain, and
ained there three years, during which time he executed
y celebrated works; but there will be occasion to men-
ı this subject lower down. In 1536 also Titian appears
ave met Charles at Asti, after his return from Africa.

n 1537 he painted for the church of Santa Maria degl'
geli, at Murano, an Annunciation, which was rejected
account of the price, 500 crowns (about 100 guineas);
he presented the picture to Charles V., who sent him
0 crowns in return. In 1541 he painted the Descent of
Holy Ghost upon the Apostles for the altar of the
rch of Santo Spirito; and three others, in oil, for the
ing, the Sacrifice of Abraham, David and Goliah, and
Death of Abel. Copies were afterwards substituted
these works, which were removed to Santa Maria della
ute; and in 1543 he painted a picture of the Virgin
San Tiziano for his native place, in which he intro-
ed his own portrait. In the same year he was invited
Pope Paul III. to Bologna, and painted his portrait
re, a celebrated picture, with which the pope was so
ch pleased, that he requested Titian to go with him to
me; but the painter was obliged to decline, on account
an engagement with the duke of Urbino, for whom he
nted several pictures.

A letter from Aretin to Titian, of the year 1545, shows
what great favour Titian stood with the government of
nice: it speaks of his large pension, and the many
posts from which he was exempted. In the same year
ere was a false report of his death, which appears to
ve distressed the emperor, from a letter which Titian
mself wrote to Charles to contradict it. In this year also
tian visited Rome, and painted Paul III. again, with the
rdinal Farnese and Duke Octavio Farnese in one group.
orthcote terms this picture one of the finest examples
portrait in the world; and he relates that he and Fuseli
w it together at Capo di Monte, at Naples, and the
tter exclaimed upon seeing it, 'That is true history.'

Aretin wrote several letters to Titian whilst he was at Rome, one of which, dated October, 1545, he finishes by requesting him not to be so lost in contemplation of the Last Judgment, in the Sistine chapel, as to forget to make haste back, and be absent from him and Sansovino all the winter. Michael Angelo visited Titian with Vasari in the Belvedere, whilst he was painting a picture of Jupiter and Danaë, and Vasari says he praised the picture very much in the presence of Titian: and he afterwards spoke very highly of his colouring and execution; but he observed that it was a pity that the Venetian painters had not a better mode of study, and were not early initiated in sound principles of drawing; and he added, that if Titian had been as much assisted by art as he was by nature, nothing could surpass him.

Titian is said to have made only a short stay in Rome; and he visited Florence on his return to Venice: yet, according to Vasari, he must have remained in Rome until 1547; for that writer says that, after the death of Sebastian del Piombo, in 1547, Pope Paul III. offered his office of keeper of the seals of lead to Titian, which however Titian declined. Late in this year he was invited by the emperor to Augsburg, whither he went in the beginning of 1548. In 1550 he went again to Charles to Augsburg, and in 1553 is said to have accompanied him into Spain, where, according to some accounts, he remained three years, but this is certainly incorrect. It was at Barcelona that Charles created Titian count palatine of the empire and made him knight of the order of St. Iago. In the patent of nobility given at Barcelona, as Ridolfi says, in 1553, which ought probably to be 1535, Titian is styled besides count palatine, knight, and count of the sacred Lateran palace, and of the imperial court and consistory. Charles left Barcelona in 1542, and did not return until 1556: for this reason Bermudez concludes that 1553 in Ridolfi has originated from an error of the copyist for 1535. Bermudez supposes that Titian left Spain in May, 1535, when Charles went to Africa, and that he went to that country in 1532, after he painted Charles for a second time at Bologna. Titian painted several works in Spain; but of those which were in the royal galleries it is not exactly known which were painted in Spain, or which were sent there from Italy, both to Charles and to Philip, or which were purchased after the death of Titian. There are however in Spain several of Titian's masterpieces: a Sleeping Venus, 'a matchless deity,' as Cumberland terms it, which was saved from the conflagration of the Prado, in the time of Philip IV., by which several of Titian's and other valuable pictures were destroyed; also two celebrated groups from the Ludovisi palace at Rome, one of Bacchanals, the other of Cupids; a Last Supper in the refectory of the Escurial, painted for Philip II.; Christ in the Garden, and St. Margaret with the Dragon. The Last Supper was sent by Titian to Philip in 1554; and in an accompanying letter he states that he had been occupied seven years over it, during which time, to use his own words, he had laboured almost continually upon it: this is another testimony that Titian was not in Spain so late as 1553 and the following years. In this letter Titian complains of the irregularity with which two grants made to him by the emperor, in 1541 and 1548, were paid, amounting to 400 crowns per annum. Philip answered it in 1558, and gave peremptory orders that the sums should be duly paid, with the following admonition, in his own handwriting, to the governor of Milan: 'You know how I am interested in this order, as it affects Titian; comply with it therefore in such a manner as to give me no occasion to repeat it.' These 400 crowns, together with the 300 granted by the state, were alone sufficient to support Titian in a comfortable manner; and the income derived from his works alone enabled him to live in great affluence: his house was a place of resort to the nobles of Venice. He painted many pictures for Philip. In a letter addressed by Titian to Philip, shortly after Philip married Queen Mary of England, Titian mentions a Venus and Adonis, which he sent him at the same time, also a Danaë, which he had previously sent, and a Perseus and Andromeda, and a Medea and Jason, which he was about to send; likewise a religious piece, which he had had ten years in hand. He does not name this religious piece; but about this time he painted his celebrated picture of the Martyrdom of San Lorenzo for Philip II.: it is a night scene, and the whole light of the picture is from the fire, two torches, and a ray of light from heaven. In this picture, though he was then old, Titian has displayed a power of composition and design equal to his colouring, and has much surpassed every other master who has painted this subject: he repeated the picture, with some slight alterations in the background, for the church of the Jesuits at Venice. The Spanish picture has been engraved by C. Cort, and the Venetian by J. J. Oortman. Titian often repeated his pictures; but the principal part of the copies were painted by his scholars: he finished them only, but he generally introduced some alterations in the backgrounds.

In 1566 Vasari visited Titian, and, although he was then 86 years of age, he found him with his pencil in his hand, and derived great pleasure from his conversation. The pencil of Titian however was active for still ten years, although the pictures he produced at this time were not calculated to add to his reputation: they are extremely careless and slight in their execution. He died of the plague in 1576, aged 96, with the reputation of the greatest colourist and one of the greatest painters that ever lived; and having himself enjoyed a European fame for upwards of seventy years: he was buried, by express permission of the senate (which, as he died of the plague, was necessary), without pomp in the church of Santa Maria gloriosa de' Frari, where his famous picture of the Assumption of the Virgin stood before it was removed to the Academy; but no monument has yet been raised to him, though a splendid one was projected in Canova's time.

Much has been said by the Florentines, and some recent critics of different schools, in disparagement of the design of Titian; yet, as far as regards propriety of design, there can be no comparison between the earlier and best works of Titian and those of the anatomical school of Florence in the latter half of the sixteenth century. In the works of Titian there is no ostentation of any kind whatever; no artifice. In composition, in design, in chiaroscuro, and in colouring, he sought truth only, and that according to his own perception of it. It is generally allowed that for the pictorial imitation of nature, without any addition or selection, Titian has surpassed all the other great painters of Italy; but in invention, composition, and design he was very inferior to many of the great painters of Rome and of Florence; yet in design he has had no superior in the Venetian school. His works are purely historical, or simple pictures of recorded facts, and he is said to have always painted from nature. It is in colouring that Titian is pre-eminent: the same grandeur of colour and effect characterise everything that he painted—whether in the figure, in the landscape, in the draperies, or in other accessories. His chiaroscuro is true, because in his works it is a part of the colouring, but it never constitutes, as in some of the works of Correggio, an independent object. Titian's object appears, from his works, to have been to produce a faithful imitation of every appearance of nature in what he represented:—thus we find in all his best pictures that infinite variety of local tones which appear in nature. He was one of the first who commenced the practice of glazing. He excelled in women and in children: his numerous Venuses, as they are called, are well known: of these perhaps the most richly and transparently coloured is that at Dresden; there is a duplicate of this picture in the Fitzwilliam Museum, at Cambridge. In his naked men he was not so successful: perhaps of these the best is his John the Baptist, in the Academy at Venice, formerly in the church of Santa Maria Maggiore. There are two other remarkable pictures by Titian in the collection of the Venetian Academy which have not been mentioned—a Presentation in the Temple and a Deposition from the Cross. The former, originally belonging to the old church della Carità, is an admirable example of Titian's simple and natural style of composition; it contains many portraits: the latter is a remarkable specimen of the surprising boldness of touch, yet truth and brilliancy of colouring, which distinguish the best of his latest works.

There is no list of the works of Titian, and it would not be an easy task to make one. His portraits are extremely numerous, and in this department he is almost universally considered to have surpassed all other painters, not excepting Vandyck, although this great painter was superior to Titian in many respects. There is at Windsor a picture said to be the portrait of Titian and Aretin, or some senator, by Titian, which cannot be too highly praised: it is certainly, for colouring, one of the first pictures in the world. There are several other admirable pieces by Titian in England: two in the Bridgewater Gallery, of Actæon and Calisto; the Princess Eboli with Philip II., at Cambridge, from the Orleans Gallery, the repetition of the Dresden Venus mentioned above; and the Cornaro Family, at Northumberland House. There is also in the Louvre at Paris a remarkably fine picture for the composition and colour, representing the Entombment of Christ: it is a repetition of the picture of the same subject in the Manfrini palace at Venice.

Titian, Aretin, and Sansovino the architect, were great friends, and were almost inseparable when at Venice. Titian painted Aretin several times; he is also said to have painted several portraits of Ariosto, who was likewise his friend: there is one in the Manfrini palace at Venice. Considering Titian's great reputation, little is known concerning his private life, but he appears to have been of an amiable disposition and agreeable conversation: he seems however to have been particularly susceptible of jealousy. He is said to have been even so jealous of his own brother Francesco Vecellio, that he induced him to give up painting and to follow the occupation of a merchant. His reputed jealousy of Tintoretto as a boy has been mentioned. [Tintoretto.]

His biographers Ridolfi and others relate several anecdotes showing his intimacy with Charles V., and the respect that the emperor had for him. Upon one occasion, when Charles was present, whilst he was painting, Titian let his brush fall, and the emperor immediately picked it up and gave it to Titian, saying, 'Titian is worthy of being served by Cæsar' ('Titiano e degno esser servito da Cesare'). Northcote the painter wrote a Life of Titian, or, as some say, got Hazlitt to write it for him: 'The Life of Titian, with Anecdotes of the Distinguished Persons of his Time,' London, 1830, 2 vols. 8vo. This book of 784 pages is a mass of matter thrown together without judgment or arrangement, and it contains several inaccuracies and some contradictions. It consists of two reviews of Titian's life, which are distinct lives; the second review, 'from Ridolfi, Ticozzi, and others,' beginning with ch. xxviii. or page 73 of the second volume, is the better portion of the work, but does not appear to have been written by the same hand that wrote the other portion.

To be enabled to appreciate fully the powers of Titian it is necessary to examine his works at Venice; after Venice he is seen to most advantage in Madrid. Bermudez has given a kind of list of his public works in Spain, in his 'Dictionary of Spanish Artists;' he enumerates about [illegible] Titian's scholars were not very numerous: the best were Paris Bordone, Bonifazio Veneziano, Girolamo di Tiziano, and his son Orazio Vecellio. His imitators were more numerous: they include to a certain extent all the great painters of Venice of his time, who acquired a reputation subsequently to his own. Titian is said to have engraved on copper and on wood.

There were several other painters of the family of the Vecelli.

VECELLIO, FRANCESCO, the brother of Titian, was born at Cadore, in 1483; commenced life as a painter, and imitated the style of his brother. He afterwards took to a military life, returned again to painting, and then again forsook it in 1531 for the life of a merchant, as is reported, by the advice of Titian, who is said to have been jealous of him: he was a painter of great ability. There are several excellent pictures by him in the Venetian state. He died in 1560.

VECELLIO, ORAZIO, the son of Titian, was born at Venice in 1515. He was an excellent portrait painter, accompanied his father to Rome, and assisted him in some of his works. Many of Orazio's portraits are said now to be attributed to his father. He died at the same time as his father, in 1576, likewise of the plague. He is said to have wasted much money in the study of alchemy.

Titian's property was inherited by his eldest son, Pomponio Vecellio, a priest, who, according to report, soon squandered it away. Besides these two sons Titian had a daughter named Cornelia.

VECELLIO, MARCO, called Marco di Tiziano, was the nephew of Titian, and was born at Venice in 1545. He was a great favourite with Titian, painted in a similar style, and executed many good works. He died in 1611.

(Vasari, *Vite de' Pittori*, &c.; Ridolfi, *Le Maraviglie*

rte, &c.; Zanetti, *Della Pittura Veneziana*, &c.;
, *Storia Pittorica*, &c.; Boschini, *Pitture di Venezia*,
Fiorillo, *Geschichte der Mahlerey*, vol. ii.; Northcote,
of Titian, &c.; Bermudez, *Diccionario Historico*, &c.)

CHT. [Rhine.]

CTOR (Carrier). The radius vector, in mathematics,
radius which is carried round a fixed centre, and on
a point moves, so that a curve is described by the
ined motion of the radius round the centre, and of the
on the radius. [Coordinates.]

DA (from the Sanscrit root *vid*, 'to know') means
im of all knowledge; or, according to another ety-
gy, the knowledge which contains the evidence of its
within itself—that is, revelation. But this term,
ugh in some instances it really implies the whole
ing (the eighteen vidyâs or sciences) of the Hindus,
ecially applied to the four principal books of
sacred writings. These are the Rĭch, Yajush, Sâman,
Atharvan'a. The Rĭgveda (from the radical *rĭch*, 'to
') is intended to be read on occasions when enco-
tic prayers and hymns to the elemental deities are
ribed by the law; the Yajush (from *yaj*, 'to sacrifice')
es chiefly to oblations and sacrifices, and contains
ers adapted for certain rites to be performed at the
and change of the moon, and hymns and directions
rding oblations to the manes; the Sâmaveda con-
songs of lyrical character to be recited with melody;
the Atharvaveda, which is considered to be of later
and is seldom included in the term 'the Vedas,' con-
of various hymns and incantations, the greater part of
h are intended for the destruction and perdition of
nies. To these books of their Scripture the Hindus at-
the greatest sanctity: they ascribe to them the highest
quity, and state that Brahmâ himself made them pro-
l from his mouth, or that he milked them out from
from air, and from the sun (*Manu*, i. 23), for the
performance of the universal sacrifice. According to
tradition they were coeval with creation, which had
lf taken place according to the laws of a pre-existing
da. (*Manu*, *ibid.*, 21.) They were however scattered;
ne legends state that they were lost (*Oxf. Lect.*, p. 7);
l it was not till after many years that a Rĭshi, or 'sage,'
anged them and gave them the form in which they now
known. This arrangement procured to the editor the
ne of Vyâsa, 'the arranger.' He is said to have lived
ut 5000 years ago; hence his surname of Dwâparâyana,
is, he who belongs to the second age, or yuga, of the
ld. Various sages assisted him in his labour, and
n he had divided the whole of the fragments of the
las into four parts, he taught them severally to four
erent pupils. Payla learnt the Rĭgveda, Vais'am-
ana was instructed in the Yajurveda, whilst the
nan was taught to Jaimini, and Sumantu had to pro-
gate the Atharvan'a. However in the course of time
pupils of these four sages altered some things in the
ngement of the several Vedas which had been handed
n to them, and thereby they became founders of dif-
nt schools, which are termed S'âkhâs: these are very
nerous, as may be collected by the fact that there are
less than a thousand S'âkhâs of the Sâmaveda. But
difference between these various schools of the Veda
ology is not material: it chiefly rests upon a mere
sposition of the various hymns which constitute their
hitâs, or collection of sacred songs, and has conse-
ntly no influence on the doctrine which they contain.

ach of these four Vedas is divided into two parts, the San-
â and the Brâhman'a, the latter of which is a collection of
cepts and maxims (Colebrooke, i. 12, note), or, according
Jones's translation of 'Manu,' iv. 100, of chapters on
attributes of God. Under the head of the Brâhman'a
a Veda the Hindus comprehend also the various Upani-
ads which belong to it: these are of a more dogmatic
aracter, and exhibit in a more comprehensive form the
ctrines which are obscurely expressed in the fragments,
hich in fact are all that can be truly said to form an
riginal Veda. The four Upavedas or subvedas, and the
x Vedângas or supplementary parts of the vedas, with
he Upângas, or subordinate parts, constitute in great
easure that kind of literature which enables one better to
nderstand the tenor of the sacred Trayî (the name under
hich the three vedas are collectively understood: it
eans Triad). (*Amarak*, I., i. 5, *sl.* 4 a.)

The Rĭgveda is the first in order, and its Sanhitâ con-
ains mantras, or prayers from various saints or Rĭshis to the elemental deities, who in the language of the vedas are called Devatâs. The circumstance that the names of the Rĭshis of these mantras are generally preserved, and in some instances occur even in the text, would be quite sufficient to prove that these primæval saints were themselves the authors of these prayers; but the Hindus, jealous of the divine origin of their Scriptures, explain this by saying that the Rĭshi, whose name is attached to one of the Mantras, was merely the first to whom the sacred words were either revealed, or by whom their use and application were first discovered. This Veda, like the others, has an explanatory table of contents, which is called Anukraman'î, and was composed by Kâtyâyana; and it is in this table that the names of the authors of the hymns of the Rĭgveda have been handed down with the Veda itself.

The Devatâs seem to be as various and numerous as the authors of the prayers addressed to them, and their titles and functions give to the religion of the Vedas the character of an elemental worship. From the Sanhitâ of this Veda it appears not unlikely that it was so: the invocations which it contains are chiefly addressed to the deities of fire, of the firmament, of the winds, the seasons, the moon, the sun; who are invited to be present at the sacrifice, or appealed to for wealth, or for the granting of their several beneficial qualities. The Sanhitâ of this Veda contains many mantras which may truly be classed with some of the finest specimens of poetry we possess: but this praise cannot be extended to the composition of the greater part of them; the praises and petitions are too little varied and rarely show signs of vigour of thought or felicity of diction. This however is only a proof of their high antiquity; man had not yet shaken off the trammels of nature; his individuality had not yet declared itself; hence the sometimes childish addresses to a deity of some element which was only considered in its nearest relation to those who pronounced them. Bharadwâja's hymn to the morning dawn, which is extracted from the fifth book of this Sanhitâ, and was published by Dr. Rosen in his 'Rigvedæ Specimen,' is truly sublime, although the object of the invocation is only wealth. It opens with the following line, which in the original is magnificent: 'The glowing rays of dawn rise like the golden waves of the ocean.' The request also is not pressed as it is in the second hymn of the first book. It is translated by Professor Wilson, in his 'Oxford Lectures,' p. 10, and contains the following verse: 'Indra and Vayu, this juice has been prepared; come with benefits for us; verily the libation desires you;' which is followed by a great number of lines of the same kind, and justifies the expression of the learned professor when he says that the short-sighted vanities of human desire alone constituted the sum of the Hindu's prayer.

The Rĭgveda Sanhitâ contains in its third book the celebrated Gâyatrî, which though repeated more than once in other vedas, appears to have originally belonged to the Rĭch, as it is admitted on all hands that Vis'wâmitra was the Rĭshi of the mantra where it occurs, and the other hymns of this sage all form part of this book. The following is the sacred line which it is enjoined should be repeated without intermission, and is declared to be the most divine (*Manu*, ii. 77, 78): 'Let us meditate on the adorable light of the divine ruler (Savitrĭ, 'the sun'); may it guide our intellects.' The true interpretation of this passage is given by Colebrooke (*Essays*, i. 139, 140); but as it is entirely based upon the authority of a Hindu lawgiver, who viewed the holy text in a very mysterious light, we own that the explanation offers more difficulties than the original text ever can when taken in its natural sense. It is however of the greatest importance, and occurs in various forms in most of the works which constitute the body of Hindu theology. It is continually brought forward as a proof of the monotheism of the Vedas, and as such it may well be taken, since all the commentators agree that it is not the visible material sun which is meant by the word Savitrĭ, but that divine light which illumines all, delights all, from which all proceed, to which all must return, and which alone can irradiate our intellects. (Sir W. Jones's *Manu*, p. 16; Colebrooke, i., p. 134.) Other hymns of this Sanhitâ give distinct indications of the belief in one God, and as such we would point out the one contained in the tenth chapter of the last book; it is translated by Colebrooke (*Essays*, i. 33), and begins in the following manner: 'Then there was no entity nor nonentity;

solemn sacrifice which the gods performed with him as a victim, spring was the butter, summer the fuel, and sultry weather the oblation' (14). 'By that sacrifice the gods worshipped this victim: such were primeval duties; and thus did they attain heaven, where former gods and mighty demigods abide' (v. 16). Compare with this the following passage from a hymn of the Rîgveda (x. 10):—'That victim who was wove, with threads, on every side, and stretched by the labours of a hundred and one gods, the fathers, who wove and framed and placed the warp and woof, do worship, The Purusha (first male) spreads and encompasses this web, and displays it in this world and in heaven. When that antient sacrifice was completed, sages, and men, and our progenitors were by him formed. Viewing with an observant mind this oblation, which primeval saints offered, I venerate them.' Now from this passage it is evident that Purushamedha does not mean the 'sacrifice of man;' but the 'oblation to the primeval male Purusha or Virâj,' in the same way that Pitrîmedha means 'sacrifice to the manes.' There is however no doubt that the belief in this self-immolation of Brahma or Narâyan'a for the purpose of creating the world and for its benefit, as stated by commentators, gave rise to an imposing ceremony for its commemoration. That this antient tradition of the Creator's having formed the universe, and all that is therein contained out of the different parts of his body, which were offered by him to himself, and though severed, yet encompassed by the irradiations of his soul, must have had a very deep root in the belief of the Hindus is clearly proved by their strict adherence to the division into castes, which, had it been but a political institution, could have never lasted so long. These also are distinctly stated and universally believed to have originated from a quadripartition of the Creator when he had created himself, in full accordance with the eleventh verse of the hymn we have above quoted from the Sanhitâ of this Veda. This then may be fairly taken as the origin of the two famous sacrifices which have occupied our attention. By a false interpretation of the name, and this is but too frequently the case when old institutions fall into disuse, when the language in which they are prescribed is forgotten, and when the nations for which they were intended have suffered both physical and moral degradation, by putting a wrong construction on words which were plain enough when the good was understood and valued, the modern abominations of bloody sacrifices to Kâlî, premeditated murder of men by Thugs, and the real sacrifice of a horse, may certainly have originated. We shall conclude with the following texts of the Veda:—'The Purushamedha, the As'wa, and the Gomedha, are symbolical sacrifices.' 'O ye gods, we slaughter no victim, we use no sacrificial stake, we worship by the repetition of sacred verses.' (Sâmaveda Sanhitâ, p. 32, v. 2.)

Colebrooke (*Essays*, vol. i., p. 56) translates a hymn belonging to the Vâjas'aneyî Sanhitâ, which relates to the creation, and is much in the same style of composition with those we have cited above. Another account of the same subject is given in the Vrîhad-Aran'yaka, an Upanishad of this Veda, which also agrees with the notions contained in our extracts, with the exception that in this part of the White Yajush, Virâj appears at first as the Egoistic principle; for 'when he was, and saw nothing but himself, he said "I am I." Therefore his name was Aham I.' Afterwards however he divides himself into two parts, or, in the language of the Veda, 'he wished another; and instantly he became such as is man and woman in mutual embrace. He caused this, his own self, to fall into twain; and thus became a husband and a wife.' He then procreates the whole world. This story is alluded to in Manu (book i., v. 32 and 33), where Manu himself is stated to be the offspring; but there is a great deal of confusion in almost everything that relates to Hindu antiquities, and we must rest satisfied when we have succeeded in finding one general and fundamental notion.

The Sâmaveda (from the root *sho*, convertible into *sâ*, and signifying 'to destroy:' the derivative is expounded as something 'which destroys sin:' Colebr.) is second in order, though first in excellence, according to the Bhagavad-Gita. A peculiar degree of holiness seems to be attached to it by the Hindus, although this would not appear from Manu (iv. 123 and 124). 'The Rîgveda is held sacred to the gods; the Yajurveda relates to mankind; the Sâmaveda concerns the manes of ancestors, and the sound of it raises therefore a notion of something pure.' However, it is reasonable that this Veda should a high place in the estimation of the Hindus, since it entirely relates to the Soma-yâga, or moon-plant sacrifice, which most of the hymns which constitute its Sanhitâ directed to be sung. The principal subjects of the mantras are the praises of the deities, who are supposed to honour the ceremony with their presence, and prayers the prosperity of the worshippers and those connected with them. There are also some invocations, which supposed to have the power of consecrating the fire which the oblation is cast; and others, the soma juice which it principally consists. As we have hitherto confined ourselves to an analysis of the principal parts of the Vedas, it seems proper that we should give an instance the sacrifices to which they relate, and for this purpose shall submit an abstract of the description of the plant sacrifice in Dr. Stevenson's translation of the veda Sanhitâ. To the Soma-yâga only the first classes of Brahmans are admitted, *i. e.*, those who either the Rîch, Sâman, or Yajush; for the profession the Atharva-Vedi Brahmans being to destroy enemies their presence would be inauspicious. In a moonlight night the moon-plant (sarcostema viminalis) must plucked up from the roots, not cut down, from the land on the top of a mountain, when the arani (premna spinosa) must also be collected for kindling sacred fire. When stripped of their leaves, the bare of these plants are to be laid on a cart drawn by two and brought to the house of the Yajamâna, or institutor of the sacrifice, at whose expense all the ceremonies performed for his own especial benefit. The stalks then bruised by the Brahmans with stones, and between two planks of wood, that the juice may be pressed. They are now placed with their expressed over a goat's-hair strainer, sprinkled with water, squeezed by the fingers of the Brahmans. The juice into the drona kalâsa, the receiving-vessel placed when it is further mixed with clarified butter, barley, the flour of a grain called by the Mahrattas wari, which the Sanscrit term is trin'adhânya or nivâra. now allowed to ferment till a spirit is formed, when drawn off for oblation to the gods in a scoop s'ruch, and in a ladle called chamasa, for consumption the officiating Brahmans. The soma, when prepared, is a powerful spirit: it is said in this have intoxicated S'ukra, and to have made even face all awry while he was drinking it; and, exhilarating principle, to have furnished him with might without which he could not have subdued enemies of the gods. De Candolle observes of this which he refers to the genus Apocynei, that it a juice, of which it would be erroneous to say that narcotic, since its effect is by no means calculated soothe the nerves, but much rather to deprive the of their power of activity without a stupifying Seven classes of priests are necessary to the Soma-yâga, which, as it is sacred to Soma, or 'the moon,' or rather regent, 'Soma-nâtha,' is attended with many ceremonies connected with fire. Besides the three usual sacred which are always kept alive in the house of a Brahman, fire from heaven, obtained either from or from the sun—this is very remarkable, though the process is not indicated—should be added. Fire from wood is to be joined to these, and must be obtained a process called churning, which consists in drilling piece of this wood into another by pulling a string to it with a jerk with the one hand, while the is slackened, and so on alternately till the wood fire, which is received on cotton or flax held in hand of an assistant Brahman. The New Hollanders obtain fire from wood in a similar manner, and is also practised to this day by the Russian peasants The hall where these ceremonies are performed is in the inner part of a Brahman's house, and the three fireplaces, or 'kundas,'—one might call them altars—are placed at the beginning, the centre, and the end of a serpentine wall, of between two and three feet high which runs through the 'sâlâ,' or room, and is called the 'Vedi.' But in order that these ceremonies should be efficacious, and the hymns which are sung, as noticed before, propitiate the deities therein invoked, the Sâma-veda Brâhman'a is chiefly taken up in pointing out the erities that must be practised to that effect. These are cipally fasting, which is carried to an extreme degree. when the sacrifice is terminated there is a feast, in which viands, and abundant potations of the moon-plant age, largely indemnify the devotees for their former ence: moreover the presents mentioned as necessary given to the officiating Brahmans are cows, gold, s, and provisions. The Somayâga has been three performed within the boundaries of the Mahratta ry since its occupation by the English, and doubt- accompanied with excesses of all kinds, and rites n would show how little they understood the sanctity is sacrifice, to which they cling from their innate ence to every antient institution, however dege- e and unmeaning it may have become. For what s this act of drinking the soma-juice but a kind of ment, by means of which union with the creator may tained? or rather it is the great sacrament of purifi- n, which, when duly performed with the prescribed rities, admits of reconciliation with That (Brahma- j), whose self-immolation cannot be forgotten. With- referring to the Sâmaveda Upanishads, which, as observed in this article, are of a later date, and have ged upon the topics contained in the mantras of the itâs—and the antiquity of these is admitted without ay—we shall bring forward a few verses, chosen at m, from the collection of songs belonging to this : 'That saving moon-plant, by its stream of pressed icial viands, makes us pure. That saving moon- makes us pure.' (Part i., *Prapâthaka*, vi.; *Das'ati*, 4, p. 94 of Transl.) 'O moon-plant, thou art dis- for our benefit, that thou mayest satisfy the mighty (*Ibid.*, v. xiii.) 'O Soma, our purifier,' &c. (*Ibid.*, 4, v. ix.) 'The greatly beloved, the heavenly, the ed, the wise director of the sacrifice, placed by the of consecration in heaven and earth, throughout the period of his existence, comes to us by means of the ed moon-plant sacrifice.' (*Transl.*, p. 90.) This can scarcely fail to remind the reader of the passage ave quoted from the Rĭgveda (x. 10: Colebrooke, i., p. 34). It would be tedious to quote more in support r opinion, and we refer the curious reader to the trans- n by Dr. Stevenson, London, 1842. A great many of erses of this Sanhitâ are taken from the Rĭgveda. We however whether we ought to say, with the learned r, that the whole is probably extracted and compiled the Sanhitâ of the first Veda. The Upanishads which under this head are peculiarly interesting, from the se and truly ingenious way in which theological cts are treated; but of these hereafter, as we shall proceed to describe the fourth and last Veda. The nans who chant the verses of the verses of Sâmaveda alled Udgâtrĭ (from the root *gai*, 'O sing.')

e Atharvan'a, so denominated from its having divulged by the sage Atharvan, is not generally tted to be of equal authenticity with the preceding s; and this may have been occasioned from its being m quoted, and not from any internal evidence. d the circumstance of its containing mostly incanta- of a most formidable nature, for the destruction of ies, may easily account for the neglect with which it s to have been treated: for, whilst the other Vedas n daily use with the Brahmans, and the reading of is never allowed to be omitted, the Atharvan'a, from ery nature of its contents, can be produced only on in occasions. Chapters from this Veda have fre- tly been translated: such is the incantation which Sir am Jones has inserted in the 'Asiatic Researches' i., p. 348). Another was published by Professor on, in the 'Calcutta Oriental Magazine' for October, . We shall content ourselves with the quotation of the which we find translated in Colebrooke (*Essays*, vol. i.,): 'Destroy, O sacred grass (Poa Cynosuroides), my ; exterminate my enemies; annihilate all those who hate O precious grass!' Imprecations of this kind are not ever the only subject of the Atharvan'a: it also con- s a great number of prayers for safety, and the averting alamities. There are moreover hymns and prayers to sed at solemn rites and religious exercises not specified he Yajush. From this short sketch, which it is less to extend, the reader will perceive that the arvaveda is more a book for occasional reference a treatise to be used by all the Brahmans. This is also the reason assigned by Madhusûdana Saraswatî in his 'Prasthânabedha,' quoted by Colebrooke (*Essays*, vol. i., p. 13). But the contrary opinion may still be held with very good reason; for occasional pieces could only have been added when the rest of the body of Hindu scripture had been completed, and certain omissions remarked: besides, this doctrine of hatred is in direct opposition to the general conciliatory character of Brahmanism, and may fairly give room to doubts as to its age, which, if these surmises be true, would be posterior to that of the Trayî. To the Atharvaveda are tacked a long string of Upanishads, which either belong to its Brâhman'a, of which the principal part is entitled the Go-patha, or constitute a separate body of theology, based upon the original Vedas, and following immediately after the Atharvan'a, in the complete collection of the Scriptures, without forming part of it. The latter seems to be the more plausible opinion, since Upanishads, which are avowedly spun out from some peculiar doctrine of either one or other of the preceding Vedas, are also found in this place. Both the style of their composition and the language differ so much from the mantras of the different Sanhitâs, that we may safely consider them as specimens of the second period of Sanscrit literature, and as such they will be treated of in the following sketch.

Upanishad (according to Colebrooke from the verb *sad* (*shad-lrĭ*), to destroy, to move, or to weary, preceded by the prepositions *upa*, near, and *ni*, continually, or *nis*, certainly) is in dictionaries given as a synonyme of *rahasya*, which signifies mystery. S'ankara Acharya, the celebrated expounder of a great number of these works on theology, and the author of the Vedânta-Sâra, says, at the beginning of his exposition of the Kâthaka Upanishad: 'Those who desire final emancipation, and have abjured all that is visible and perishable, and have obtained the science called Upanishad, shall be freed from ignorance and the other evils, which are the cause of the evolutions of the world (sansâra)—for then (the evils) will be removed and destroyed. This is the meaning of the root *shad*, and therefore is this science called Upanishad.' But Upanishad may be also rendered by 'session' in the sense of the Latin 'schola,' being chiefly a kind of disputation between a master and his pupil. (Windischmann, p. 1169, 1678.) Of these Upanishads, upon which the whole of the Hindu theology of the fifth century of our æra is professedly founded, there are fifty-two, the first fifteen of which are stated to be but the terminating sections of the Atharvaveda. We shall however notice only those which both in the opinion of the natives and the judgment of Europeans are considered of importance.

The Rĭgveda is followed by two Upanishads which are generally assigned to it; but which are nevertheless separate authorities for two different schools: these are the 'Aitareya,' from which an extract has been given above when speaking of the Brâhman'a of the Rĭch, and the Kaushîtakî. From the fourth chapter of the second book of the former we shall quote a passage which is singular enough, as it is explanatory of Condillac's ingenious theory of the senses. When the primeval Being had created the worlds and its regents, and was himself the primeval man, 'He reflected: "There are worlds and regents of worlds; for them will I frame food." He viewed the waters; from waters, so contemplated, form issued; and food is form, which was so produced. Being thus framed, it sought to flee. The man endeavoured to seize it by speech, but could not attain it by his voice, &c. He attempted to catch it by his breath, but could not inhale it by breathing; had he by inhaling it, (hunger) would be satisfied by smelling food. He sought to snatch it by a glance, but could not surprise it by a look: had he seized it by the sight, (hunger) would have been satisfied by seeing food. He attempted to catch it by hearing, but could not hold it by listening: had he caught it by hearkening, (hunger) would have been satisfied by food. He endeavoured to seize it by his skin, but could not restrain it by his touch: had he seized it, &c. He wished to reach it by the mind, but could not attain it by thinking: had he caught it, &c.' It is to be observed that all this time, though he had created his body, or 'purusha,' and it managed to perform these different functions, the spirit was nevertheless without or rather hovering about it; but seeing this 'He thought, "If speech discourse, breath inhale, and sight view; if hearing hear, &c., then who am I?"' He then entered the body, and the chapter concludes: 'Thus born, he discriminated the elements.'

As nothing of the Kaushîtakî has yet appeared in print, we shall limit ourselves by stating that it contains two dialogues on the same topics as those of preceding Upanishads, and that it is, together with the Aitareyaka, one of the chief authorities for the Vedanta school of philosophy. The Taittirîyaka has already been quoted as one of the most important Upanishads ascribed to the Black Yajurveda. Another Upanishad belonging to it is the Maitrâyan'î, which is the principal book of a school of Yajurvedi Brahmans, who call themselves Maitrâyan'îyas. Some passages from the Maitrayan'î have been for the first time published in a translated form in Windischmann's 'Philosophie der Weltgeschichte' (p. 1595, 1615): one of these is particularly worth noticing; it gives a definition of the soul in the following manner: 'The soul is thyself; for thou knowest that which is different from soul and is perishable.' 'But what is the soul?' asked the king. The sage answered: 'He who dwells in the body, who heeds the body, and at whose departing the body suffers whilst he does not suffer, for uncertainty (such as the body's) is not his—that is the soul. He delights in his beauty, he is immortal, fearless, and himself Creator.'

The White Yajush has two Upanishads, which are both of great length and enjoy the highest authority among the Hindus. They are the Is'avâsya and the Vrîhad-Aran'yaka, of which several extracts have been given in the course of this article. It would be tedious to adduce specimens from them, since they are all in the same style of composition with the rest, and are for the most part in the hands of the public.

The principal Upanishad of the Sâmaveda is the Chândogya, which is also very frequently quoted and part of which is well known. The following is a specimen from the second part of the seventh chapter, which is the most sacred in the opinion of the Vedânta school of philosophy; it is a dialogue between Uddâlaka and his son S'wetaketu: 'Bring here that fruit from the fig-tree.' 'Here it is, O venerable!' 'Open it.' 'It is opened, O venerable!' 'What dost thou see?' 'These small seeds.' 'Divide one of them.' 'It is divided, O venerable!' 'What dost thou see?' 'Nothing, O venerable!' The master said to him: 'From the subtile element which thou seest not was produced this tall fig-tree. Believe, O my son! &c. Throw salt into the water and come again in the morning.' So he did. To him said Uddâlaka: 'Bring the salt, which on yester-eve thou didst throw into the water. He sought and found it not, it was dissolved. 'Taste the water on this side; how tastes it?' 'Salt.' 'Taste it in the middle; how?' 'Salt.' 'Taste it on the other side; how?' 'Salt.' 'Throw it away and come to me.' So he did. He said to him: 'Thou seest not the being (τὸ ὄν) but verily it is here.' The rest of this book is highly interesting, and it is very desirable that the text should be published. The Kena or Keneshitam Upanishad, so called from its first words ('by whom it is desired'), has a reputation almost as high as the Chandogya; and here we find a curious passage, stating that the true knowledge of Brahma is not to be obtained by knowledge or understanding, but by faith: 'The master speaks: "If thou thinkest that thou dost know, then knowest thou little indeed of the essence of Brahma." The pupil considers, and observes: "I perceive; now I presume no more to say that I know (what Brahma is); nor do I know that I know it. For to him who is unconscious it is made known,"' &c. The chapter concludes with the injunction, that both faith and understanding should be united, for 'the mind when obtained through the mind acquires strength, and knowledge gives it immortality.'

The Mun'd'aka is the principal Upanishad of the Atharvan'a, and is also one of the most important for the doctrines which it contains. These are plain enough from the following words of its first section: 'The supreme science is that by which this imperishable (nature) is apprehended, which is contemplated by the wise for the source of beings. As the spider spins and gathers back (its thread); as plants sprout and germinate; as hair grows on a living person: so is this universe here produced from the imperishable nature,' &c. Another Upanishad, which is generally classed with this Veda, is entitled the Kâthaka. Colebrooke has given in his Essay (vol. i., p. 95, &c.) a complete list of the names of these Upanishads, and those of them which are either published or otherwise made known are noticed at the conclusion of this article.

The age of the Vedas has been a matter of considerable discussion and conflicting opinion; it seems however that the date now generally assigned to them is between the fifteenth and fourteenth centuries before our æra; and that Dwaipâyana, the arranger, 'Vyâsa,' or the school of which he is the reputed founder, flourished about three centuries before the Christian æra. Sir William Jones has, in his preface to Manu (p. 7), attempted to fix the age of the Yajurveda by counting the lives of forty sages through whom its doctrines were transmitted from the time of Parâsara, a Hindu sage and the father of Vyâsa (p. 11), whose epoch is fixed by a celestial observation based upon the astronomical treatise which is appended to the Veda, for the purpose of fixing the proper periods for the performance of religious duties. The conclusion he arrives at by means of this reasoning, which is not convincing, is that the Yajurveda had been written in 1580 before Christ. With the help of a similar calendar entitled Jyotish, and the place given to the solstitial points at the time of its composition is that in which those points were situated in the fourteenth century before Christ, the learned Colebrooke (*Essays*, vol. i., pp. 106, 200) seems to have settled the question. But as these Jyotish or astronomical treatises belong to the brâhman'a, or theoretical part of the Vedas, and we have had sufficient reason to doubt their being of an equal age with the Mantras, this date (14th cent. B.C.) would only be applicable to the second and later portion of the sacred scriptures, and would allow with the computation of Sir William Jones, which only professes to give the date of the Yajur) of its being removed still farther. However there can be no doubt as to their authenticity and their high antiquity, since the difference between the style of the Mantras and the Upanishads which have also been included in the date above mentioned, is as great as the style of Chaucer compared with that of Pope.

The fundamental doctrine of the Vedas seems to be this: The various elements which constitute this universe are only the various parts of the universal and primeval soul, the objective That, which by the very dismemberment of itself had lost its subjectivity. Throughout the Vedas there runs a strong vein of belief in the fall of man, who though he had received his own existence through the self-immolation of the Creator, and was originally part of him, had lost his primeval purity, to recover which sacrifices of various kinds were ordained in imitation of the great, original, and universal sacrifice. And this seems indeed to be the early tradition among all nations of the earth. The Vedic monotheism, which one would sometimes be inclined to doubt from the numerous Devatâs who are invoked in the Mantras, will appear plainly enough if the reader has the patience to read the following passage: 'The deities are only three, whose places are the earth, the intermediate region, and heaven: (namely) fire, air, and the sun. They are pronounced to be (the deities) of the mysterious names (Bhur, bhuvar, and swar), called the Vyâhritis (see Manu, ii., v. 76) severally; and Prajâpati (the lord of creatures) is (the deity) of them collectively. The syllable Om is every deity; it belongs to him (Parameshthî) who dwells in the supreme abode, &c. Other deities belonging to those several regions are portions of the (three) gods, for they are variously named and described on account of their different operations: but (in fact) there is only one deity, the great Soul (Mahân âtmâ).' Numerous passages of the same kind occur in almost every page of the Vedic literature, by which we mean the Upavedas, for a notice of which we refer to the article on Sanscrit Literature. [SANSCRIT LANGUAGE AND LITERATURE.]

Directions concerning the reading of the Vedas.—The sacred Trayî is a holy deposit in the hands of the Brahmans, who should learn and teach it incessantly for the benefit of mankind, and at the sacrifice of every indulgence, and even wealth, which might impede their reading it. (*Manu*, iv. 17.) By doing this the Brahman becomes the chief of all created things; through him all mortals enjoy life, and therefore he is to be treated with more respect than a king (*Manu*, i. 96, 100, 101; ii. 139; &c.); yet with all this power he must be humble, and his attire d on no account be wasted on worldly studies; and hould be unremittingly directed to the Vedas, and teaching of the scriptures should be done gratis; for on is not to be considered as a profession (iii., 180; 92, 186, 205); and consequently he is not even ed to receive any gifts (x. 109-11; xi. 194-197) from nost unexceptionable persons (iv. 186; 91). His support ought to be the Veda, and he ought always seen with his staff and a copy of the Vedas in his s (iv. 35-39). The Institutes of Manu (c. ii., v. 70- v. 92-127) give very full directions as to the manner ich the sacred books are to be read. They must not ad without the accents and letters being well proced; nor ought they to be read by night when the wind s the Brahman's ear, nor by day when dust is cold; nor as long as the scent and unctuosity of pers remain on his body; he must first perform his ablu- . Even the times for the reading of the different parts e Vedas are fixed by law; the Vedas themselves, *i.e.* Mantras, must be read during the bright fortnights, the Vedângas he ought to read in the dark half of the th. Many of these rules are attended to even now; many new directions have been introduced into the d since the time that Sanscrit has ceased to be gene- understood; for, like the Koran among the Mohamans, the Veda is put into the hands of children in the period of their education, and continues afterwards to ead by rote for the sake of the words, without comension of the sense; and accordingly it is read in ous superstitious modes, word by word, either simply aning them, or else repeating the words alternately wards and forwards; and copies are prepared for these other modes of recital, which are called Pada, Krama, . Ghan'a, &c. (Colebr., vol. i., 20, 21.) We may also rve here that the principal metres used in the hymns of Vedas are the Jagatî, Gâyatrî, and Trishtup.

he existence of the Vedas has been doubted as late as 1, when Paulinus à S. Bartholomæo (*Systema Brahnicum*, Romæ, p. 281) calls them fabulous, for the dus were anything but communicative on the subject. ey had however been partly translated into Persian as y as 1656 A.D. by the command of Dârâ Shukoh, the ther of Aureng Zeb. The books thus translated for were the Upanishads, and of these a specimen is en in White's 'Institutes of Tamerlan,' Oxford, 1783: re is also a short extract from them in Halhed's pre- to his 'Code of Gentoo Law,' London, 1781. In Anquetil du Perron brought out his translation, ler the following title: 'Oupnek'hat, *i.e.* Secretum endum, opus ipsa in India rarissimum, continens aniam et arcanam S. theologicam et philosophicam docam e quatuor sacris Indorum libris Rak Beid, Djedir d, Sam Beid, Athrban Beid, excerptam ad verbum ersico idiomate, Sanscreticis vocabulis intermixto in inum converso,' &c., 2 vols. 4to. It might well be ected that a work translated into Persian by Mohamdans, and re-translated verbatim into Latin, would very different from the original; moreover, Anquetil ms to have done everything in his power to write most unintelligible Latin. His book is accordingly ite valueless as far as the accuracy of the contents are acerned, although it will always remain an interest- work for the great erudition which its author has disyed both in the preface and the notes with which it is riched, and for the circumstance of his having been the st to acquaint the Europeans with anything relating to e older belief of the Hindus. Afterwards a summary of e Vedas, as good as a summary can be, was given by lebrooke in the eighth volume of the 'Asiatic Rearches,' p. 369-476; it was reprinted in his 'Miscellaous Essays,' London, 1837, p. 9-114, and from this we ve largely drawn.

In 1830 Dr. Rosen published his 'Rĭgvedæ Specimen,' ondon, 4to.; and in 1838 appeared, after his death, his lition of the first book of the 'Rĭgveda Sanhitâ,' 4to., th a Latin translation and explanatory notes, mostly philogical. Professor Wilson has announced his intention publish the whole of the Sanhitâ of this Veda for the riental Text Society.

Of the Yajurveda there appeared a forgery under the tle 'L'Ezour Vedam, ou Anciens Commentaires der Veam,' &c., publié par De Sainte-Croix, Iverdun, 1778, vols. 12mo. Deguignes was the first to doubt its authenticity; but it was not until F. Ellis had published his Account of a Discovery of a modern imitation of the Vedas' in the 'Transactions of the Literary Society of Bombay,' vol. iii., pp. 1-59, that it was found to be the work of the Roman Catholic missionary Roberto de' Nobili, who used it about 1620 for purposes of conversion.

Dr. Mill of Cambridge is preparing an edition of the text of the Yajurveda Sanhitâ, which we hope will soon make its appearance.

We have a translation of the Sanhitâ of the Sâmaveda by Dr. Stevenson of Bombay, published in London in 1842, for the Oriental Translation fund, and the text will in all probability issue from the press in a few weeks.

The Kâtha, Kena, Is'a, and Mun'd'aka Upanishads have been translated by Rammohun Roy in Calcutta at different periods, and were reprinted in London in 1832 in one volume, bearing the title 'Translation of several principal Books of the Vedas,' &c.; from which most of the French and German translations have been made.

VEDANTA. [SANSCRIT LANGUAGE AND LITERATURE.]

VEERING, or WEARING (from the French, *virer*), is that movement of a ship in which, supposing her to have been previously sailing with the wind on either bow, she is brought, by her head being turned to leeward, into a contrary position, so that the wind is on the other bow, and the direction of her course is reversed.

If in the operation of tacking the ship loses so much of her forward motion as to be incapable of yielding effectually to the action of the water on the rudder, and thus of turning her opposite bow towards the point from whence the wind is blowing, the ship is said to miss stays; she then drifts to leeward, till by the action of the water on the lee side of the rudder the head is again turned from the wind, when she is brought to her previous position. In this case, should it be necessary to persevere in endeavouring to change the course, and should the ship be not too near a point of danger, the proposed end may be gained by veering; and the evolution is thus effected:—When, in drifting to leeward, the ship begins to fall off, or to turn her head from the wind, the helm is placed hard a-weather, and the after-sails are hauled up so that the wind may act upon the others only, and that the ship may be brought before the wind: the helm is then placed exactly fore and aft, and the velocity of rotation continuing, the ship's head begins to turn towards the wind, which will then be on the opposite bow. The helm being now turned to leeward, the mizen-sail hauled out and its stay-sails set, the ship comes rapidly into the required position.

This evolution is frequently the only one which can be performed in stormy weather when little sail can be carried, and also when sailing with a light breeze; since, in either of these cases, the ship may not have sufficient velocity to allow of being put about by tacking: the disadvantage of veering is that, during the evolution, the ship is sometimes carried far to leeward, and the loss of space can only be diminished by executing the movement with as much rapidity as possible.

Box-hauling is an evolution similar to that of veering, and is put in practice when a rock or some other danger is suddenly seen a-head. If it be supposed that the ship is already close hauled, the after-sails are to be taken up, the helm turned a-lee and the head-sails laid back; by these means the ship's head begins to turn from the wind, and her forward motion is arrested. As the ship's head continues to turn, the wind begins to act on the after-surfaces of the head-sails, giving a small motion forward; and then the helm is shifted so as to co-operate with the wind in causing the ship's head to fall farther off. The rest of the evolution is similar to that which is performed in the act of veering.

VEGA CARPIO, FRAY LOPE FELIX DE, was born at Madrid, November 25th, 1562. His father, as he informs us in his 'Laurél de Apolo,' p. 45, was also a poet, to which circumstance may perhaps be ascribed his early taste for poetry. According to Montalvan (*Fama Posthuma*, p. 15), before Lope had attained the age of five, he could read Spanish and Latin; and before his hand was strong enough to guide the pen, he recited verses of his own composition, which he had the address and good fortune to barter for prints and toys with his playfellows. At the age of twelve he had, by his own account, not only written several short poems, but composed dramas in four acts; and during the intervals which his studies at school afforded him, he was always rhyming. Having lost his father when he was about thirteen, he was soon after impelled by so strong a desire of seeing the world, that he resolved to escape from school. He concerted his project with a schoolfellow, and they actually left Madrid together, without the knowledge of their relations or their masters. Being however detected in their flight, Lope and his schoolfellow were brought back to their relations. Upon his return to Madrid, young Lope ingratiated himself with the bishop of Avila by several pastorals, and a comedy in three acts, called 'La Pastoral de Jacinto,' which is justly considered as a prelude to the reform which he meditated in the Spanish stage. It is moreover probable that during this interval, between school and the university, which he was enabled to enter through the liberality of his patron the bishop, he composed several poems, which he retouched in after-life. After spending four years at the university of Alcalá, Lope became attached to the duke of Alva, at whose request he wrote his 'Arcadia,' a mixture of prose and verse, romance and poetry, pastoral and heroic, the design of which is avowedly taken from Sannazaro, though its execution has been pronounced by Spanish critics to be far superior to the model. The 'Arcadia,' though written perhaps as early as 1580, was not published till 1598. Some time after Lope had executed the command of his illustrious patron, he left his service, and married a lady of rank, Doña Isabel de Urbino. He continued to cultivate poetry with increased enthusiasm, until being involved in a duel with a gentleman of rank, he wounded his antagonist, and was obliged to separate himself from his wife, whom he loved tenderly, and leave Madrid. Lope fixed upon Valencia as the place of his retreat; but some years after, having previously ascertained that he would not be prosecuted, he returned to the capital, and was reunited to his family. He did not however long enjoy this new-found happiness: his wife, whose health had been for some time on the decline, died shortly after his return. To fly from such painful recollections, Lope became a soldier, and joined the 'invincible Armada.' The fate of that expedition is well known; and Lope, in addition to the difficulties and dangers of the voyage, had the misfortune of seeing a beloved brother expire in his arms. During this unfortunate voyage Lope composed his 'Hermosura de Angelica,' a poem which professes to take up the story of that princess where Ariosto left it, and which Marini, one of his Italian admirers, has not hesitated to pronounce superior to the 'Orlando.' On his return from the Armada, Lope quitted the career of arms, and entered the service, first, of the marquis of Malpica, and afterwards of the count of Lemos, with whom he remained until his second marriage, to Doña Juana de Guardia, a lady of Madrid: he was then twenty-eight years old. About eight years after this event, in 1598, on the occasion of the canonization of St. Isidorus, a native of Madrid, Lope entered the lists with the best poets of the day, and surpassed them all in the number and merit of his performances. Prizes had been assigned for every style of poetry, but no more than one could be obtained by the same person. Lope succeeded in the hymns; but not contented with this, he produced besides, in an incredibly short space of time, a poem of ten cantos, in short verse, as well as several sonnets and romances, and two comedies, which he published together under the feigned name of Tomé de Burguillos.

This was perhaps the most fortunate period of Lope's life: he had, by his own statement, written already no less than nine hundred dramas for the stage, besides twelve volumes of other poetry; and although the remuneration then given to authors was very moderate, he wrote so much, and had so many presents conferred upon him by men of rank, who were anxious to become his patrons, that he was enabled to live in affluence. He had a son named Carlos, on whom he doated, and who promised to be the heir of his talents. The period of his domestic happiness did not last long: his son died; his wife soon followed her child to the tomb, and Lope was left with two daughters. The spirit of the poet seems to have sunk under such repeated losses; and he resolved to soothe it by the exercise of devotion. Accordingly, having become secretary to the Inquisition, he shortly afterwards became priest, and in 1609 a sort of honorary member of the brotherhood of St. Francis. Meanwhile the reputation of Lope as an author was rising to that height which it afterwards reached: and he worked as assiduously as ever. He seldom passed a year without giving some poem to the press; and scarc a month, or even a week, without producing some pl upon the stage. In a very short space of time 'Los Tr umphos de la Fé,' 'Las Fortunas de Diana,' three novels prose, 'Circe,' an heroic poem, and 'Philomena,' a gular, but tiresome allegory, were the fruit of his pr pen.

Such was his reputation, that he himself began to trust the sincerity of the public, and wishing to asce whether the extravagant applauses heaped upon were the result of fashion or a homage paid to merit, he published a poem without his name. either the number of his productions had gradually f the public taste to his own standard of excellence, fertile genius was so well adapted to the taste of the that his 'Soliloquies of God,' though printed under a name, secured him as many admirers as his former ductions. Emboldened probably by this success, he cated his 'Corona Tragica,' a poem on Mary Queen of to Pope Urban VIII., who wrote him a letter of ledgment in his own hand, and conferred on him the of doctor of theology. About the same time C Barberini, the pope's nuncio, followed him with ve in the streets; Philip III., himself a poet, would gaze at such a prodigy; the people crowded round wherever he appeared; the learned and the studio Europe made pilgrimages from their country for the purpose of conversing with Lope. So associated wa idea of excellence with his name, that it was common conversation to signify anything perfect in kind; and a Lope diamond, a Lope day, or a Lope became fashionable and familiar modes of exp Lope had dangerous rivals in Gongora and C with neither of whom he seems to have lived on terms. Indeed, if we are to judge from the many allusions contained in his writings, Gongora and were sworn enemies to each other. As to Cervantes probable that the immense popularity which Lope Vega enjoyed, and the honours which he received all parts of the country, may have awakened a se of jealousy in his breast; whilst Lope was living in perity and splendour, the author of 'Don Quixote' actually starving in the same street! Lope conti publish plays and poems, and to receive every that adulation and generosity could bestow, till the 1635, when his health gradually declined, and he e on Monday, the 26th of August, in the seventy-third of his age. He was buried at the convent of nuns in Calle de Cantarranas, whence his remains have lately removed to the National Pantheon of Madrid.

Notwithstanding his undisputed talent, Lope is known for the prodigious number than the quality of writings. According to a calculation made by one of panegyrists, twenty-one million three hundred thousand his lines were actually printed, and no less than eig hundred plays of his composition acted upon the 'Were we to give credit to such accounts,' says Lord land, 'allowing him to begin his compositions at the ag thirteen, we must believe that upon an average he more than nine hundred lines a day; a fertility of nation, and a celerity of pen, which, when we con the occupations of his life as a soldier, a secretary, master of a family, and a priest; his acquirements Latin, Italian, and Portuguese; and his reputation erudition, become not only improbable, but abs and one may almost say physically, impossible.' there can be no doubt that Lope was, even in p Spain, the most prolific of writers. Montalvan tells that when Lope was at Toledo he wrote fifteen acts fifteen days, making five plays in a fortnight. He hi self informs us in the eclogue to Claudio, one of his la works, that he had written upwards of fifteen hundred dramas, one hundred of which had been composed in many days:

> 'Pues mas de ciento en horas veinte quatro
> Pasaron de las Musas al theatro.'

In addition to the works mentioned in the course of this notice, Lope wrote several epic poems, as 'La Jerusale Conquistada;' 'La Circe;' 'La Dragontea' (on the 'Dea of Sir Francis Drake'); 'La Andromeda;' numerous pas torals; 'Los Pastores de Belen;' 'La Dorothea,' &c. &c.

rlesque poem, entitled 'La Gatomachia;' several es, and other short poems, which were collected and ed at Madrid, 1776-79, 21 vols. 4to. But it is not on any se productions that the reputation of Lope really rests: as founded on his dramas, in which he showed him- aster of his art. The number and merit of his plays, at od when the Castilian language was generally studied ghout Europe, directed the attention of foreigners to Spanish theatre, and probably induced them, more than orks of any one writer, to form their compositions the model which Corneille and others afterwards ed. His plays have always been popular in Spain. now, when the introduction of the French dramatic ol has considerably lessened the taste for the old a, 'La Moza de Cantaro,' 'La Noche Toledana,' others of Lope's plays are still acted on the Madrid e.

rd Holland has given, after Huerta, a list of all dramas attributed to Lope de Vega, which exist in at. There are 497 plays, and 21 'Autos Sacramen-' in all 518, to which number may be added many h have been lost, and many more which, though acted e stage, were never printed, besides those which are erved in manuscript. There is an edition, consisting 5 volumes in quarto, published in parts between and 1647, at Madrid, and other places in Spain, which excessive rarity, and of which we only know of three ect copies, one in the library at Holland House, Ken- on; another in the possession of Don Agustin Duran, adrid; and a third, which is now in the collection of John Labouchere. The library of the British Museum esses one; but the title-pages of the volumes are inted.

ontalvan, *Fama Posthuma*, Mad., 1637, 4to.; *Parnaso ol*, vol. xiv.; Lord Holland's *Some Account of the s and Writings of Lope Felix de Vega Carpio and llen de Castro*, Lond., 1817; Lardner's 'Cabinet Cyclo- a,' *Literary and Scientific Men of Italy, Spain, and tugal*, vol. iii.)

EGA, GEORGE, a German mathematician, and colonel he Austrian artillery, was born at Sagoritz in Carniola, 754. His family name is said to have been Veha, but be transformed into Vega. His parents, though in ced circumstances, gave him the benefit of a good ation, and sent him to prosecute his studies at Lau- h, where, under the tuition of Maffei, who was after- s bishop of Buntzlau in Bohemia, he made great pro- s in the mathematics: for this prelate he entertained highest esteem and gratitude, which, but two years re his death, he testified by dedicating to him a second ion of his principal work.

ega commenced his military career by entering into a s of engineers, with which he served, first in Carniola, afterwards in Hungary: here his merit and his know- ge of the military sciences soon procured for him the ce of the emperor Joseph II., who gave him the ap- tment of mathematical instructor in the imperial artil- y, with the rank of lieutenant in its second regiment.

hough engaged in the duty of giving lessons, and in composition of his works, he served with the Austrian y in Flanders at the commencement of the wars arising m the French Revolution, and distinguished himself on eral occasions by his gallantry: he was raised in 1796 the rank of major, and subsequently to that of lieutenant- lonel; and, with the dignity of a baron of the empire, was made Chevalier of the order of Maria Theresa. hile thus enjoying the prospect of attaining the highest itary honours, he was suddenly deprived of life, in the h year of his age, by the hand of an assassin. In 1802, hile at Rusdorf near Vienna, having made an agreement h a miller of that place for the purchase of a horse, he out in company with the man, intending to proceed to e stable where the horse was kept. On the way, while ssing a bridge, the colonel, who went first, was struck the ground by a blow on the head from behind, and efore he could recover he was dispatched by repeated rokes: his body, from which the murderer took a watch, purse of money, and a case of drawing instruments, was en thrown into the Danube. Nine years afterwards a rotractor, having on it the name of the unfortunate olonel, and which was one of the instruments in the case, ing found in the possession of the miller, was the cause f detection. On being examined, the man prevaricated, and having at length confessed his crime, he was condemned and executed.

Vega is known as a mathematician by several useful works: the first of these is entitled 'Logarithmische-trigonometrische und andere zum gebrauche der mathematik tafeln und formeln,' 8vo., Vienna, 1783. Of the others, the principal are 'Vorlesungen über die Mathematik,' Vienna, 1786. This work contains treatises on arithmetic and algebra, geometry, trigonometry and the infinitesimal calculus, mechanics, hydrostatics and pneumatics; and an edition was published at Vienna in 1819. 'Thesaurus Logarithmorum completus ex arithmetica logarithmica et ex trigonometria artifiriali Adriani Vlacci collectus, etc.,' Latin and German, Leipzig, 1794; 'Manuale logarithmico-trigonometricum, matheseos studiosorum commodo in minorum Vlacci, Wolfii aliarumque hujus generis tabularum logarithmico-trigonometricarum mendis passim quàm plurimis scatentium, locum substitutum,' Leipzig, 1800. This is a second edition with additions. It is divided into four parts: the first contains an explanation of the properties of logarithms; the second and third contain tables of the logarithms of numbers, sines, tangents, &c.; and the fourth is a treatise of plane and spherical trigonometry. Besides the above works, Vega published an introduction to chronology (Vienna, 1801); and in 1803 there was published at the same place a tract on weights, measures, and coin, which he had written. He was a member of several learned societies; among others, those of Göttingen, Erfurt, and Berlin.

(*Biographie Universelle.*)

VEGETABLE BUTTERS. [BUTTERS, VEGETABLE.]

VEGETABLE IVORY. The substance known by this name consists of the seed of a genus of plants belonging to the natural order Pandaneæ of Brown, and referred by Lindley to the order Cyclanthaceæ. The name of the genus is *Phytelephas*, from *phuton* and *elephas*, the Greek version of its English name. Under this name it was first described by Ruiz and Pavon, in their 'Systema Vegetabilium Floræ Peruvianæ.' It was also described by Willdenow under the name *Elephantusia*, but the former name is now generally used. It is commonly called Tagua plant; and in Peru, Calebra de Negro, Negro's Head.

This genus is characterised by possessing pinnated fronds and an erect stem. The flowers are arranged on a spadix enclosed in a universal spathe, and are of two sorts, the one containing both stamens and pistils, the others only pistils. The spadix is crowded with flowers, and the stamens are very various; the style is divided into 5 or 6 deep segments; there is no visible calyx or corolla; the fruit consists of quadrilocular drupes, which are aggregated into a large muricated coriaceous head. The seeds are about the size of a pigeon's-egg, and of an oblong-ovate triangular shape. When young they contain a crystalline liquor without odour or taste, which is regarded as a refreshing drink by travellers. In the process of growth however this once opaline liquid becomes milky and opaque, acquiring some taste and odour, and at last it is converted into a substance in many instances whiter and harder than ivory. If the liquid of the seed is kept long, even when it is clear, it becomes sour, thus indicating that, although clear and tasteless, it contains some carbonaceous principle, as well as water. There are two species of *Phytelephas*, yielding seeds of the same kind: the *P. macrocarpa* has a low stem and large fruit, whilst the *P. microcarpa* has little or no stem and small fruit. These plants, which have an external character something between a palm and a Cycas, occur in South America, in the valleys of the Peruvian Andes, and especially on the borders of the river Magdalena. The natives of these districts have used the seeds from time immemorial, for the purposes of making buttons, heads to walking-sticks, and various trinkets; but it is only within a recent period that they have been used for these purposes in Europe. They are now extensively used, as far as their size will permit them, for the manufacture of almost all the articles for which ivory had been in use before, and as they can be made at a cheaper rate, their sale is at present somewhat extensive. In the use of the nuts for turning, considerable difference is found in their quality; some are comparatively oily and soft, and work up with ease, whilst others are so brittle as to be unmanageable in the lathe. They do not answer so well as ivory for the construction of delicate articles, as they are much more easily fractured; and although at first these seeds are whiter than ivory, they are not found to retain their colour so well.

It might at first appear difficult to account for the germination of these plants, as the albumen, which is destined to nourish the young plant, is as hard as ivory. But this is provided against by the hard albumen absorbing water, and thus not only becoming soft, and capable of being used by the embryo, but it also loses its whiteness. It regains these properties when dry. The embryo is small compared with the size of the seed, of a sweet taste, and lies enclosed in a little bag at one end of the seed, the presence of which is indicated by a slight swelling on the external part of the seed. When the seeds are brought into this country they are contained in a soft external tegument of a light colour, and about the eighth of an inch in thickness, with a dark mark indicating the point of attachment. This covering is easily removed, and the seed underneath is of a dark brown colour, from a membrane which is closely attached to the albumen. In some cases this is of a reddish colour, especially on the smaller seeds, and these are probably the produce of the smaller species of the plants. When the seed is cut completely through, an irregular cavity is found in the centre. This should be attended to in working it.

The structure of the ivory albumen was examined by the late Mr. Daniel Cooper, who read a paper on this subject at the Linnæan Society, in December, 1841. On submitting a piece, that was ground very thin on a lapidary's wheel, to the microscope, it was seen to be composed of a homogeneous substance, which was traversed in a particular direction by canals or tubes which were somewhat irregular in their shape, and occasionally terminated with a fimbriated extremity. These canals gave off with great regularity diminutive lateral prolongations, each of which terminate in a small blind pouch-like enlargement. These lateral canals were bounded by a distinct line, beyond which they never extended. Mr. Cooper believed these canals to be filled with oil, as they had a darker colour than the surrounding matter, and presented a perceptible difference of refractive power. This structure is similar to that which has been observed in the seeds of Sagus, Cocos, Attalea, &c., by Von Martius. The small canals filled with oil are probably the cause of the hardness of these seeds. It is stated by Ruiz and Pavon, that wild animals, especially bears, feed on them; but this is probably when they are young, or after they have lain on the ground for some time, and got soft, as in the state in which they are brought into this country it is difficult to suppose that any animal could either eat them or digest them.

(Ruiz and Pavon, *Syst. Veg. Fl. Per.*; Cooper, Paper 'On Vegetable Ivory,' *in Microscopical Journal*, No. 16.)

VEGETABLE WAX. Various plants yield a substance like wax, which is obtained, like the vegetable butter, by bruising and boiling them in water, when the wax melting floats to the surface and there concretes on cooling. Of these the most remarkable instance is the *Ceroxylon andicola*, the Wax Palm, Palma de Cera of the American Spaniards. Myrica Gale, Candleberry Myrtle, or Sweet Gale, a native of this country, yields a substance resembling bees'-wax when its catkins or cones are boiled in water: so *M. cerifera*, a native of North America, yields a similar substance when its berries are thus boiled: candles are made of it also, whence the plant is commonly called Tallow-shrub or Candleberry-tree. *M. quercifolia*, a native of the Cape of Good Hope, is another species which yields a vegetable wax. It grows along the coast, on dry sandy plains exposed to the sea-air, where hardly any other plants will vegetate. The wax invests the berries in the form of a rough crust, which is separated by means of boiling water. It is of a greenish colour, but may be bleached. When made into candles it gives a very fine light. A vegetable wax is also obtained in China from Ligustrum lucidum, which is frequently mentioned as the wax-tree in Dr. Abel's and other travels. Many other plants will no doubt be found to yield similar substances when a little of the trouble now paid to the discovering of new or the renaming of old species is applied to the examining the products of plants.

VEGETABLES. VEGETABLE KINGDOM. Although the more common objects in nature are easily referred to the respective kingdoms to which they belong, as a block of granite to the mineral, an oak to the vegetable, and a man to the animal kingdom; yet each of these kingdoms has referred to it objects whose characters are of a doubtful nature. It is on this account that naturalists have sought for a definition of these kingdoms that would enable at once to refer to one or the other the various objects nature. With this view Linnæus laid down the following axiom—'Mineralia crescunt; vegetabilia crescunt vivunt; animalia crescunt, vivunt, et sentiunt.' But will not assist the naturalist much. The mineral kingdom is perhaps not often confounded with the other although its distinction could not always depend on definition of Linnæus. The distinction given between animal and vegetable kingdoms is the possession of sensation by the former. But how is sensation to be determined? If by motion from external stimuli, then the sensitive-plant and Dionæa to be called animals sponges and jelly-fishes plants; if, on the other hand, possession of a nervous system is to determine the then, as we have failed to demonstrate this in the and polyps, they must still be called plants. defined an animal by its possession of a stomach; fails of being a distinctive mark in many of the classes of what are generally admitted as animals; Aristotelian indication, the possession of a mouth, be always applied. There is in fact still a great in determining the limits of the vegetable and kingdoms; and botanists and zoologists are constantly ting in their claims for the right of exclusive study tain beings which exist at the point where the animal vegetable kingdoms meet. That there is such a may be easily made apparent by tracing the groups plants from the exogens through the endogens down the lower forms of fungi and algæ, and animals from Mammalia, through birds, reptiles, fishes, mollusks, polyps, down to the infusoria and sponges. The kingdoms of nature may be each represented as from a common point, and the farther any group of is from this point the more they are unlike the This may be seen in the following scheme:—

ORGANIC MATTER.

Vegetable Kingdom.	Animal Kingdom.
Exogenæ.	Vertebrata.
Gymnospermæ.	Mollusca.
Endogenæ.	Articulata.
Rhizanthæ.	Radiata.
Acrogenæ.	Acrita.

Indeterminate existences.
Organic Elements.
Gases.
Water.
Metallic Oxides.
Metals.
Mineral Kingdom.

INORGANIC MATTER.

The following is the definition of a plant by an botanist, and is perhaps as good as can be given in the sent state of our knowledge:—'A plant is a living deprived of sensation or power of moving from place to place, and fed by means of external roots.'

In the classification of the vegetable kingdom there been two modes generally adopted. The one has been take one or two characters of plants, and according to differ in this point, to arrange all the vegetable kingdom. This mode of arrangement is called artificial, and one which was adopted in the celebrated sexual system Linnæus, in which the number, position, structure, the stamens were made the basis of the principal divisions. The other mode has been to take into consideration all the points of resemblance between the structure and functions of the species, and then to group them according to their degrees of relationship, and the systems resulting from this are called natural. The former only be made use of as matters of convenience, and in nowise be looked upon as the end of science, while latter are the only means by which science can be advanced, and the inquiries of naturalists must ever be directed towards the perfecting such systems. Under the articles EXOGENS and ENDOGENS will be found an of the orders belonging to those classes of plants, shall here give an analysis of the Acrogens, as given by Lindley, in his 'Key to Systematic Botany.'

ACROGENÆ.

Alliance 1. Filicales. Stem fistular, vascular. Re-oductive organs borne upon the leaves.

ng of the thecæ vertical . .	*Polypodiaceæ.* § *Cyatheæ*, End.
ng of the thecæ transverse . .	*Gleicheniaceæ.* § *Parkerieæ.* § *Hymenophylleæ.*
ng wanting; thecæ 1-celled, ribbed	*Osmundaceæ.*
ng wanting; thecæ as if many-celled	*Danæaceæ.*
ng wanting; thecæ 1-celled, veinless	*Ophioglossaceæ.*

Alliance 2. Lycopodales. Stem solid, vascular. Re-oductive organs growing on the stem.

ecæ naked	*Lycopodiaceæ.*
ecæ inclosed in involucres of the same form	*Marsileaceæ.*
ecæ enclosed in involucres of two different forms	*Salviniaceæ.*

Alliance 3. Muscales. Without a vascular system. erminating processes uniting into a heterogeneous body. orules in distinct thecæ.

tecæ valveless, with an operculum	*Muscaceæ.*
tecæ opening into valves, with an operculum	*Andræaceæ.*
ecæ opening into valves, without an operculum	*Jungermanniaceæ.*
ecæ valveless, without an operculum	*Hepataceæ.*

Alliance 4. Charales. Without a vascular system. rminating processes uniting into a heterogeneous body. productive organs axillary globules.

Characeæ.

Alliance 5. Fungales. Without a vascular system. rminating processes either wholly distinct or confluent a homogeneous body.

rn from a matrix, which veils them when young	*Fungaceæ.*
rn without a matrix. Living in air. Cellular, rarely filamentous, with a reproductive nucleus bursting through their surface . .	*Lichenaceæ.*
rn without a matrix. Living in water. Filamentous; the filaments ither solitary or several glued ogether, having sporidia and viviparous	*Algaceæ.*

The affinities of the three great classes, Exogens, Endo-ns, and Acrogens, with the two smaller ones, Gymno-rms and Rhizanths, 'may be expressed,' says Professor idley, 'by a circle, in the middle of whose circumfer-e stand Exogens and Endogens, side by side; the nmon point of all the classes is formed by Acrogens, ich are connected on the one hand with Exogens by mnospermæ, and on the other hand with Endogens by izantheæ. The following scheme will make this idea ident:—

Chloranthaceæ *to* Gnetaceæ.
EXOGENS. { Ranunculaceæ *to* Alismaceæ.
Nymphæaceæ—Hydrocharaceæ.
Menispermaceæ—Smilaceæ.
Aristolochiaceæ—Araceæ. } ENDOGENS.
Araceæ *to* Balanophoraceæ.
GYMNOSPERMS. { Cycadaceæ *to* Filicales.
Coniferæ—Lycopodiaceæ.
Equisetaceæ—Characeæ. } ACROGENS. . .
Fungaceæ
to
Rafflesiaceæ.
RHIZANTHS.

The vegetable kingdom performs important offices in e economy of creation. It stands between the mineral d animal kingdoms, disposing and arranging the elements of the first, in order to fit them for the purposes of e last. Each of the three kingdoms of nature is comsed of matter as its basis; but the animal kingdom di-y appropriates no portion of the elements of the in-nic world to its uses, but derives them all from the table kingdom. The late researches of chemists, more especially those of Liebig, show that the proximate principles of animal bodies are identical with those of vegetables, and that consequently, as these principles do not exist in the inorganic kingdom, they must have been formed in plants. Thus we must regard the vegetable kingdom as one vast chemical laboratory, in which the food of animals is being prepared. Without vegetables animals would perish, and although some animals live on the flesh of others, yet that flesh is always originally derived from the vegetable kingdom. The proximate principles of plants are not numerous, and are composed of hydrogen, oxygen, nitrogen, and carbon; those containing nitrogen are directly appropriated by animals to the formation of their tissues, whilst those containing no nitrogen are either consumed in generating animal heat, or deposited in the form of fat. When animal bodies cease to exist, their tissues become resolved into their primitive elements, a process which is constantly going on in animal bodies during life. These elements, in the state of various compounds, are carried off into the atmosphere, when gaseous; or assist in forming the soil on the surface of the earth, when solid. The principal compounds which are thus generated are carbonic acid and ammonia; and if accumulation of these gases took place to any extent in the atmosphere, the consequences would be a cessation of vitality, in both the animal and vegetable kingdoms; but here again plants perform an important office, for these very compounds combined with water are the principal sources of the elements which plants elaborate into so many secretions necessary to the existence of animals. There is thus a relation established between the animal and vegetable kingdoms, of which man has extensively availed himself in the application of manures to the artificial production of food. In this relation too are involved the laws of the production of plants for food in communities with circumscribed districts, to the investigation of which comparatively little attention has been given.

In addition to supplying food and purifying the atmosphere for animals, the vegetable kingdom is made use of extensively by man. The larger forms of plants are used for the building of houses and ships, the construction of furniture, and a thousand implements necessary in the arts of life. The various secretions of plants, their oils, resins, acids, neutral and alkaline principles, all exert a powerful agency on the human system, and are employed for the purpose of controlling, changing, and interrupting the diseased actions to which man is subject. Another large class of plants furnishes him with luxuries, as tobacco, tea, coffee, spices, perfumes, and fruits of various kinds; and to these must be added fermented liquors, which are all produced from the fermentation of the saccharine juices of plants. A great part of the clothing of man is the produce of the vegetable kingdom: cotton, flax, and hemp are of vegetable origin, and when the fabrics which are made from them are worn, they are mostly coloured with the secretions of the turmeric, indigo, orchil, catechu, and others.

Climate is also modified by the vegetable kingdom. The presence of thick forests intercepts the rays of the sun, and the earth has a lower temperature in consequence. On the other hand the heat of the surface of the earth is changed by the difference of radiating power between plants and the soil on which they grow. The constant absorption and exhalation also of a large body of plants will affect the humidity of the atmosphere according to the circumstances in which they may be placed. Another consequence of the existence of plants is the production of malaria during their decay. There is perhaps no fact better proved than that decaying vegetable matter is the source of the most dreadful pestilences that affect human beings. The direct agency by which this is effected is unknown; it is called malaria, and is alike produced by decaying plants in the swamps of Africa, the jungles of India, the savannahs of America, and the ditches of Europe. No part of the world where vegetables are produced is free from its influence; and even in large cities, perhaps the only places susceptible of being made a refuge from its scourge, needless accumulations of decomposing vegetable matter are allowed to become the source of disease and death.

For an account of the functions of the vegetable kingdoms, see TISSUES, VEGETABLE; SAP; SEED; ROOT; SECRETIONS, VEGETABLE: for the structure and classifica tion of vascular plants, see Endogens; Exogens: for the characters, uses, and medical properties of plants, see the names of natural orders and genera: for the geographical distribution of plants, see Vegetation.

VEGETATION, the collective phenomena presented by plants in their distribution over the surface of the earth. It is not till within a comparatively recent period that any attempt has been made to ascertain in what manner the varied forms of plants are distributed over the surface of the earth, or what causes determine the existence of one plant in a particular locality or country, to the exclusion of others. The labours of Humboldt, Von Martius, and Schouw have done much towards elucidating the former point, and the progress of vegetable anatomy and physiology is constantly revealing the causes of the latter circumstance. It has indeed been known for a long period that the ordinary productions of one country were not to be obtained from another, and that the vegetation of cold and hot countries differed; but this knowledge, up to the time of Linnæus, was of the most general and unsatisfactory character. In this article we shall endeavour to point out some of the causes that influence the distribution of plants, and give a sketch of their distribution, according to the regions proposed by Professor Schouw.

Of the agents that determine the distribution and character of plants none have more influence than light. Wherever plants have a large supply of light, there will the vegetation be prolific, and all the secretions of plants will abound. It is by this agent that the functions of absorption, exhalation, and the decomposition of carbonic acid and other compounds are effected by plants. It is, in fact, a powerful stimulant of vegetation, and it acts as all stimulants do on organic bodies. If a plant is withdrawn from its influence, it becomes weak, its tissues soften and are filled with water, and few or no secretions are deposited; on the contrary, if plants are supplied with continued light, they become overstimulated, they decompose carbonic acid rapidly, and become stunted in their growth on account of the rapid development of solid secretions. The influence of this agent is seen remarkably in the vegetation of the surface of the earth. In the tropics the direct rays of the sun are felt by plants, and under their influence a prolific and gigantic vegetation is developed, but this arises from the alternate withdrawal and presence of this agent during every twenty-four hours, and as this is constantly the case, vegetation remains the same throughout the year. On the other hand, at the poles, only the oblique rays of light are felt, and consequently its influence is comparatively feeble. For a great proportion of the year there is no light, and then there is no vegetation; but when it is called into existence, by the influence of light and heat, the light, being never withdrawn, stimulates to excess the plants, and a small hard, scrubby, and stunted vegetation is the result. The gradations of vegetation may be seen, under the influence of this agent, in passing from the tropics to the poles. From the magnificent baobabs, banyans, and palms of the tropics, we pass through the regions of oaks, elms, and firs, of temperate climates, till in polar regions the only representatives of trees are a few brambles, and the majority of plants are mosses and lichens.

Another agent is heat. By some this has been supposed to have more influence than light on the distribution of plants, but it is difficult in nature to separate its influence from that of light, since it is derived from the same source at the same time. However experiments on a large scale are constantly going on in European hothouses, in which it is proved, that although tropical plants be supplied with their natural temperature, nothing will make up for the want of light, and many of them seldom produce their flowers and less seldom their fruit, and after a languishing existence soon die. The influence of heat on vegetation is seen in those climates where there is a great difference of temperature between summer and winter. The plants of such districts that live throughout the winter are so constructed that they are enabled to bear the cold of winter. They have frequently thick barks, in which are deposited resinous secretions, and are thus enabled to withstand the decrease of temperature. It is also found, for this reason, that those plants which thrive in hot summers are best adapted to withstand the cold of winter, on account of the greater amount of solid secretions deposited in their bark, and many plants which flourish in districts where there are hot summers and severe winters will perish in climates where the extremes of heat and cold are not so great. Thus many plants will grow around Paris, where the extremes of heat and cold are great, which will not grow around London, where these extremes are less; and the same holds good with regard to London and Edinburgh, and the Floras of the south of England and the north of Scotland afford abundant evidence of the truth of this position. It is only by supposing that some change has taken place in the extremes of heat and cold in Scotland that we can explain the fact of the disappearance of the forests that once covered with a dense vegetation its now barren hills.

Water, as an agent affecting vegetation, must be regarded in two points of view: first, as existing in the atmosphere as vapour, modifying temperature and controlling the function of exhalation and absorption in plants; and secondly, as existing on the surface of the earth in the form of oceans, rivers, lakes, swamps, &c. The composition of the waters of these last also, or rather the substances which may be dissolved or suspended in the water, produce considerable effect upon vegetation. Many Orchidaceæ are only found in the humid forests of the tropics. The vegetation of seas and lakes varies with the circumstances of the ingredients they contain in solution, and with the comparatively restless or quiet condition of the waters. Swamps produced by overflowings of the sea produce different plants from those produced by accumulations of fresh waters from mountain sides.

The characters of the soil influence the vegetation of particular districts. The previous agents exert an influence on vegetation which is most evident in the characters of the great mass of plants of a district; but the soil produces effects on almost every individual plant. The influence of soil arises from its mechanical character and chemical composition. The mechanical character of most importance is its amount of disintegration. Some plants, as lichens, grow on the surface of rocks and large stones, and are not found in districts where these are not present. Some require a loose soil for the free passage of their roots, and are only found growing in sands. Others again will only exist in tenacious soils, and are found growing in clays. The mechanical character of soils also greatly influences their relation to the absorption and radiation of heat, and thus affects the temperature of the soil. This is a subject that has not received much attention, and might be made productive of important practical results: there can be no doubt of its influence on the distribution of herbs of a delicate structure. The chemical composition of the soil has perhaps more influence than its mechanical character. The researches of the chemist have shown us that whatever may be the variety of secretions in plants, they are composed of only a few elements, and that these elements are chiefly supplied by the soil. Hence it is necessary for plants that water, carbonic acid, and ammonia be found in every soil, and vegetation will flourish according to the amount of these ingredients that is supplied to it. But not only do plants require these compounds which exert a general influence, but large groups of plants require particular ingredients. Thus endogenous plants contain silex in their structure, and the presence of this ingredient in the soil will determine their growth. Other plants require chloride of sodium, and will only grow, if land-plants, on the sea-shore, or if water-plants, in the ocean. Plants frequently perish when they have exhausted a soil of an ingredient necessary to their existence, and will be frequently succeeded by other plants which would not have grown where the ingredient necessary to the existence of the other plant was present. This is taken advantage of by the farmer in the rotation of crops. Some conferve will only grow in thermal springs, whilst others only vegetate under the influence of sulphuretted hydrogen.

The last influence to which we shall refer is the atmosphere. Chemically it remains in its great constituents, oxygen and nitrogen, constantly the same. But the quantity of the vapour of water which it contains, and whatever salts that vapour may be capable of containing, cause it to vary much. The influence of these agents in the air however is not different from the same in the soil. The agitation of the air by constant winds has often an important influence on vegetation, and the barren hills and coasts of many countries are owing to the impossibility of plants withstanding the influence of strong winds. The density of the atmosphere is a point of importance, and seems to disturb ıe relation between elevation and latitude. This subject ıs been examined by De Candolle, who comes to the fol- ıwing conclusions:—

1. The natural situation of each plant at a determined evation above the level of the sea is so much greater in ·oportion as the country is nearer the equator, and less in ore temperate regions; that is to say, the farther we cede from the equator, the greater influence has the ex- ›sure upon the temperature.

2. In temperate climates, as France, for instance, those ants which are but little affected by temperature, and which ·ow in all its latitudes, are also found at all those eleva- ›ns where the earth is not covered with eternal snows; ›m the level of the sea to the summits of the mountains.

3. If plants which, according to their nature, avoid either o high or too low a degree of temperature, yet grow different latitudes, we may observe, that it is at heights here the effect of elevation may compensate that of lati- de: thus the native plants of the northern plains will be ›en to grow upon the mountains of the south.

4. Plants which are cultivated upon a large scale are uided by laws which entirely correspond with the pre- ›ding: those which are cultivated in various latitudes ill grow indifferently at various heights; those which are ıly found at certain latitudes will extend no farther than proportional elevations.

5. The elevation above the level of the sea, when we ›mpare the temperature of the seasons, establishes effects ry analogous to those which result from the distance from e equator; so that there is the more analogy between e results on vegetation in the two cases. In proportion we rise in a direct line, it follows, from the lessened nsity of the air, that the intensity of the solar light con- ıues to increase: this effect is represented in the line of stances from the equator, because the perpetuity of light ıring the continuance of vegetation is so much the ›eater in proportion as the latitude is more elevated.

6. In proportion to the greater height upon the moun- ıns, so will the hygrometer be seen to indicate a less egree of humidity: the same general effects take place s we recede from the equator to the poles. (Hooker, in Iurray's *Dictionary of Geography*.)

Several methods have been proposed by De Candolle ›d other botanists for giving an idea of the distribution ' vegetation over the surface of the globe. In the fol- wing remarks we have followed that of Professor Schouw, his 'Notes for a Course of Lectures on the Distribution ' Plants.' This method has been adopted by Sir Wm. ooker and Dr. Lindley in their works, and though not ›e from imperfections, is probably the best that has been ›vised.

1. Region of Saxifrages and Mosses, or the Alpine Arctic ora: temperature 1·75° to 41° Fahr. This corresponds th the hyperborean region of De Candolle and other iters, and comprehends all countries within the polar rcle, namely, Lapland, the north of Russia and Siberia, amtchatka, Labrador, Greenland, and Iceland, and also ırt of the Scottish and Scandinavian mountains, as well the mountains of the southern and central parts Europe, which have sufficient elevation to possess an pine vegetation. This region is characterised by the undance of mosses and lichens, and of the families ıxifragaceæ, Gentianaceæ, Alsinaceæ, Salicaceæ, and ›peraceæ. There is an entire absence of tropical families, d only a few plants of the temperate zone. The beech d fir occur in forests, or there is a destitution of trees. nnuals are also scarce, and the blossoms of the flower are rger in proportion to the root of the plant, and of a pure lour.

2. Region of the Umbelliferæ and Cruciferæ: tempera- re 27·5° to 56·75° Fahr. This comprehends the whole of urope, except those districts which belong to the pre- ·ding region, from the Pyrenees, the mountains of the uth of France, of Switzerland, and the north of Greece, ı the greater part of Siberia, and the country about Iount Caucasus. This region is particularly distinguished om that of the same parallel in North America by the resence of cruciferous and umbelliferous plants. It is not ısily distinguished from the next region, but the fungi bound more, and it approaches the last region in the bundance of Cyperaceæ. Nearly all its trees are deciduous, ıd its meadows are exceedingly flourishing. There is a ivision of the Compositæ; the plants belonging to the Cichoraceous division of that order being found in the northern districts, whilst those belonging to the Cynarocephalous are found in the south of it. The predominating trees are the Scotch fir, the alder, the beech, the birch, the poplar, the elm, and lime. The shrubs are the heaths, the sloe, &c. The principal cultivated plants are the wheat, barley, oats, maize, potatoes, &c.; apple, pear, gooseberry, currant, vine, strawberry, cucumber, melon, the cabbage, turnip, peas, beans, and other forms of Leguminosæ; carrots, hops, hemp, flax, &c.

3. The region of Labiatæ and Caryophylleæ, or the Mediterranean kingdom: temperature 54·5° to 72·5°. This includes the region of the Mediterranean Sea, limited on the north by the Pyrenees, the Alps, the Balkan, and Caucasus; on the south by the Atlas and the deserts of North Africa; on the east by Taurus. It contains more or less of the orders belonging to the last region; but Labiatæ, Caryophyllaceæ, Boraginaceæ, Cistaceæ, and Liliaceæ abound. A few tropical plants now and then appear amongst them, belonging to the orders Palmaceæ, Terebintaceæ, and Lauraceæ. Solanaceæ and Leguminosæ are more abundant than in the last, evergreens increase, and the vegetation never entirely ceases; but verdant meadows are more rare than in the last. Madeira, Azores, and the Canary Islands belong to this region, and their Flora approaches to that of tropical Africa. The cultivated plants are similar to the last, to which are added the olive, orange, lemon, mulberry, fig, rice, &c.

4. Region of Asteraceæ and Solidagineæ, or North North-American kingdom: temperature −9·5° to 59°. It embraces North America from the southern limits of the first kingdom to 36° N. lat. There are a greater number of Coniferæ than in the second kingdom, and there are but few Umbelliferæ, Cruciferæ, Cichoraceæ, and Cynarocephaleæ. There is but little cultivation: where there is any it resembles that of the second kingdom. Whortleberries, oaks, firs, Michaelmas daisies, and golden rods are its great characteristics.

5. Region of Magnoliaceæ, or Southern North-American kingdom, between 36° and 30° N. lat.: temperature 59° to 72·5°. There is here an approximation to tropical vegetation, as seen in the frequent appearance of the genera Canna, Chamærops, Yucca, Zamia, Laurus, Bignonia, Passiflora, Cassia, Sapindus, &c. There are comparatively few plants that are characteristic of the two preceding kingdoms. The magnolias predominate, and are accompanied with other genera bearing broad shining leaves and large flowers. The cultivated plants are those of the third region, with the exception of the olive: rice is more abundant, and in the southern districts the sugar-cane is grown.

6. Region of Camellias, and Celastrineæ or Chino-Japanese kingdom. It embraces Japan and Northern China from 30° to 40° N. lat.: temperature 54·5° to 68°. Too little is known of this region to enable us to state positively what are its characteristics. Its vegetation is more tropical than European. With zamias, ginger, bananas, and custard-apples, are found buckthorns and honeysuckles, thus giving this region a mixed character. Its cultivated plants, in addition to those of previous regions, are the cycas for sago, the tea-plant, the caladium, &c.

7. The region of Zingiberaceæ, or Indian kingdom: temp. 65·75° to 81·5°. This includes the Indian peninsulas east and west of the Ganges, together with the islands between India and New Holland. Tropical orders are numerous in this region, as Palmaceæ, Araceæ, Euphorbiaceæ, Bignoniaceæ, Buttneriaceæ, &c. Very few plants belonging to Cyperaceæ, Coniferæ, Labiatæ, Rosaceæ, Ranunculaceæ, or Cruciferæ are seen. The trees never lose their leaves, and produce large magnificent flowers, and are covered frequently with climbing and parasitical plants. Ginger, zedoary, cardamom, arrowroot, catechu, cassia, cinnamon, caoutchouc, tamarinds, sago, rice, cocoa-nut, coffee, cubebs, cloves, pepper, oranges, and gamboge are the cultivated and natural productions of this prolific region.

8. Region of the Himalaya: temp. 36·5° to 65·75°. It includes the highlands of India, or the mountain terraces lying on the south of the Himalayan range, Kamoon, Nepaul, Bootan, having an elevation of from 4000 to 10,000 feet. The tropical forms of the last kingdom decrease manifestly here, such as Scitaniaceæ, Palmæ, Cycadaceæ, &c. European forms are not unfrequent, as Cyperaceæ, Amen

taceæ, Coniferæ, Primulaceæ, Rosaceæ, Cruciferæ, &c. The Ferns and Orchidaceæ are abundant. The cultivated plants are the corn and fruit of Europe, varying with more tropical productions according to elevation.

9. The region of Polynesia includes the islands between Hindustan and New Holland, and has a temperature from 65·75° to 83·75°. This region is similar to the Indian kingdom, and is sometimes included in it. The cultivated plants, in addition to those of the Indian kingdom, are the bread-fruit tree, the nutmeg, the camphor-tree, and the cotton-tree.

10. The region of Java is little known, and has a vegetation probably similar to the Himalayan region.

11. The Oceanic region, or South Sea Island kingdom, includes all the islands of the South Sea within the tropics, and has a temperature of 72·5° to 81·5°. The Flora of these islands is poor, and approximates more closely to that of Asia than to that of Africa, and has some relation to that of New Holland. The bread-fruit is the most characteristic production of these islands, but is not confined to them.

12. The region of Balsomodendra, or the Arabian kingdom, includes the south-westerly mountainous part of the Arabian peninsula. The temperature cannot be stated, but the character of its vegetation is generally tropical, assuming the forms of that of India. The cultivated plants are also principally those of India.

13. The Desert region includes North Africa south of the Atlas, and the Mediterranean Sea between 15° and 30° N. lat., and the northern part of Arabia. The mean temperature is 7·25° to 86°. It has necessarily a very poor Flora, having but few even characteristic genera. It is only cultivated in the oases, where the Phœnix dactylifera, the Sorghum vulgare, with wheat and barley, and some of the fruits of Europe and India, constitute the prominent plants.

14. The region of tropical Africa includes Africa from 15° N. lat. to the tropic of Capricorn. Temperature 72·5° to 86°. This Flora is neither rich nor rare; it abounds in Leguminosæ, Rubiaceæ, and Cyperaceæ. The Adansonia is a characteristic genus.

15. Region of Cacti and Piperaceæ includes Mexico and South America to the Amazon river, and to a height of 5000 feet above the level of the sea. Temperature 68° to 83·75°. The orders which characterize this region are Bromeliaceæ, Piperaceæ, Passifloraceæ, and Cactaceæ. The orders which are mostly tropical are here less numerous, whilst extra-tropical orders are more abundant. The most abundant genera are Phytelephas, Kunthia, Thouinia, Theobroma, Guazuma, &c. The cultivated plants of this district are the maize, Sorghum vulgare, Dioscorea alata, Convolvulus Batatas; also the plantain, cocoa-nut, pine-apple, tamarind, cacao, vanilla, coffee, sugar, tobacco, cotton, &c.

16. Region of the Mexican Highlands includes the mountains of Mexico above 5000 feet elevation. Temperature from 65·75° to 79·25°. In this district the more tropical forms of vegetation, as the tree-ferns, the palms, passion-flowers, Euphorbiums, and pepper decrease, or altogether disappear. The extra-tropical forms are more numerous, as the willow, oak, fir, cypress, sage, horehound, whortleberry, heath, and various forms of Umbelliferæ, Rosaceæ, Caryophyllaceæ, Cruciferæ, and Ranunculaceæ. The cultivated plants are the maize, the European Cerealia, and fruits. In the highest mountain-ranges the vegetation has an alpine aspect.

17. Region of Cinchonaceæ. This embraces the Andes from 5000 to 9000 feet in elevation, and between 20° S. lat. and 5° N. lat., having a temperature from 59° to 68°. The extra-tropical forms become very frequent in this region, and only a few tropical forms remain. Some of the most common genera are the Cinchona, Gay-Lussacia, Loasa, Lilæa, Cervantesia, &c. The cultivated plants are very seldom tropical. Maize and coffee are sometimes grown, with European Cerealia, and fruits, potatoes, and Chenopodium Quinoa.

18. Region of Escallonias and Calceolarias includes the Andes at more than 9000 feet above the level of the sea between 20° S. lat. and 5° N. lat. Temperature 34·25° to 59°. Tropical plants almost entirely disappear in this region, only now and then a straggler appearing; whilst the forms which distinguish the colder and polar regions become frequent, such as the lichens, mosses, sorrels, plantagos, gentians, currant, brambles, &c. The most prevalent orders are the grasses, heaths, and Synantheræ. There are no large trees, and a great many shrubs.

19. The West Indian region, including the West India Islands, with a temperature of 59° to 79·25°. The vegetation of these islands bears the same relation to the continent which that of the Polynesian islands does to China. It is chiefly distinguished by the greater quantity of ferns and Orchidaceæ. The cultivated plants are the same as those of Mexico.

20. Region of Palms and Melastonaceæ, or Brazilian kingdom, including Brazil, or South America, on the east of the Andes, between the equator, and the tropic of Capricorn: temperature 59° to 83·7°. This region is remarkable for the number of its genera and species, the size of individual trees, the dense forests, and the numerous climbing and parasitical plants. Vegetation seems here to attain its greatest activity and energy. The orders which abound most are Palmaceæ, Hæmadoraceæ, Gesneriaceæ, Melastomaceæ, Sapindaceæ, and, altogether confined to this region, Vochyaceæ. The cultivation is very similar to that of Mexico.

21. Region of Woody Compositæ. In South America, on the east of the Andes from the tropic of Capricorn to 40° S. lat.: temperature 59° to 74·75°. There are but few tropical plants in this region, and extra-tropical plants, especially European forms, are abundant, more than [illegible] being common to this region and Europe. The Woody Compositæ abound. This region consists chiefly of plains (pampas), which for hundreds of miles present almost the same vegetation, consisting chiefly of thistles and grass. Wheat, the vine, and the peach are cultivated.

22. The Antarctic region includes the south-western part of Patagonia, Tierra del Fuego, between 50° and [illegible] S. lat.: temperature 41° to 47·5°. In this region there are no tropical plants, and its vegetation resembles in a great measure the North-European Flora (region 2). In some of the genera there is an approach to the South African and New Holland Flora.

23. Region of Stapelias and Mesembryanthemums. It embraces South Africa from the tropic to 35° S. lat.: temperature 54·5° to 72·5°. The vegetation of this region is not luxuriant, but it is very rich in forms. There are no dense forests nor climbers, but many succulent plants. The orders Restiaceæ, Ividaceæ, Proteaceæ, Ericaceæ, Ficoidaceæ, Bruniaceæ, Diosmaceæ, Geraniaceæ, Oxalidaceæ, and Polygalaceæ, embrace its characteristic vegetation. On the sandy coasts the genera Stapelia, Mesembryanthemum, and Diosma are found, and on the mountains Proteas, Erica, and Crassula. The cultivated plants are those of Europe, with the Musa Paradisiaca, Convolvulus Batatas, the tamarind, and Sorghum Caffrorum.

24. Region of Eucalypti and Epacridaceæ. It includes extra-tropical New Holland and Van Diemen's Land: temperature 52·25° to 72·5°. Vegetation is not abundant in this region; but this deficiency is compensated by the variety and peculiarity of its forms. The most abundant of the trees are the Eucalypti, which form three-fourths of all the woods. Next come the genera of Proteaceæ, Banksia, Hakea, Dryandra, Grevillæa, &c.; and next to these follow Epacridaceæ, Diosmaceæ, and Casuarineæ. Its cultivated plants are all European.

25. The region of New Zealand includes the two New Zealand isles: temperate. One-half of the species are European. The vegetation is not characterised by the prevalence of large groups. Some of the genera approximate to the South African Flora, and some the New Holland.

The following works should be consulted on the geography of plants:—Linnæus, 'Stationes Plantarum;' Humboldt and Bonpland, 'Essai sur la Géographie des Plantes;' Humboldt, 'De Distributione Geographica Plantarum;' Brown, 'General Remarks on the Botany of Terra Australis;' Schouw, 'Grundzüge einer Allgemeinen Pflanzen-geographie;' Meyen, 'Grundriss der Pflanzen-geographie;' Bischoff, 'Lehrbuch der Botanik;' Hooker, in Murray's 'Dictionary of Geography;' De Candolle, art. 'Géographie des Plantes;' 'Dict. des Sciences Naturelle;' Lindley, 'Int. Bot.,' 2nd. ed.

VEGETIUS, FLAVIUS RENATUS, a Latin writer on the military art, concerning whom nothing is known beyond what can be gathered from his work itself. In the MSS. the titles 'Vir Illustris,' or 'Vir Illustris Comes,' are added to his name. He must have lived and written out the year A.D. 385, in the reign of the emperor Va- itinian II., to whom the work is dedicated: it consists of e books, and bears the title, 'Epitome Institutorum Rei litaris.' There are several expressions in the work ich leave no doubt that the author was a Christian. It written in a plain and easy style, and considering the e period to which it belongs, the language is purer than ght be expected. Vegetius himself appears to have had practical knowledge of the subject on which he wrote; t he derived most of his materials from earlier writers, ong whom he mentions Cato Censorius, Cornelius lsus, Frontinus, Paternus, and the constitutions of Au- stus, Trajan, and Hadrian, concerning military affairs. nsidering the loss of earlier and better works on the litary regulations of the Romans, the work of Vegetius a valuable relic of antiquity; but it is to be regretted at the author did not use sufficient discretion in keeping e different periods apart: for he sometimes mixes indis- minately institutions and regulations of the early times th those existing in his own days. The first book treats the formation and training of soldiers; the second, of e divisions and subdivisions of an army, and the arrange- ents of a camp; the third, of military discipline, the re to be taken of the welfare of the soldiers, and of the wing up of an army in battle array; the fourth, of ges, military engines, and of the mode of attacking and ending fortified places; and the fifth, on maritime war- e. The first edition appeared without place or date, out the year 1472. There is a good edition by P. Scri- ius, with commentaries by G. Stewechius and F. dius, Antwerp, 1607, 4to. It contains also some other ient works on military affairs. The best edition is that N. Schwebel (Bipont, 1806, 8vo.), with notes by the tor, and some of those of his predecessors.

VEINS. [CIRCULATION; HEART.]

VEINS, DISEASES OF. The physiology of the veins y be found in the article CIRCULATION: in the present icle their principal diseases will be described. Of these e most frequent is that in which they become what is lled varicose, that is, dilated, and unnaturally tortuous, disease which occurs especially in the subcutaneous ins of the lower extremity. It is the result of the coats the veins losing their elasticity, and thereby their power resisting the pressure of the column of blood above em. The loss of elasticity is commonly due to disease of ir coats, and is frequently accompanied by an increase their thickness, and by destruction or impairment of ir valves. The dilated veins appear like large tortuous e canals beneath the skin, or in extreme cases, where ny are coiled together, they form projecting tumours. ey produce inconvenience, both by the pain which results m their distension, and occasionally by the skin over em ulcerating, and allowing them to burst and bleed pro- ely; but their more common effect is, that in parts of the n below them, either spontaneously or after slight in- ies, ulcers form, which, in consequence of the circulation ing impeded through the dilated veins, are very tedious healing.

For this varicose state of the large veins numerous re- dies have been proposed; but the best are only pallia- e. A temporary remedy is afforded by the recumbent sture, in which the walls of the veins are relieved from e weight of the column of blood: constant advantage is forded by the wearing of a well-applied bandage, or of elastic stocking, by which a sufficient pressure is ap- ied to prevent the further distension of the veins. The literation of the venous trunks may be effected by cut- og or tying them in various ways, or by applying some ustic, so as to make the tissues over them slough; but ese proceedings are not without danger, and at present is very doubtful whether they are often productive of ermanent advantage. Patients had better, in general, e content with the palliative remedy of the bandage or astic stocking.

A form of varicose disease of the veins, which often ac- ompanies that of the venous trunks, but sometimes exists lone, and with which ulcers of peculiar obstinacy occur, ffects the small vessels about the ankle and lower part of e leg. The skin in this disease is almost uniformly red, rough the number of small veins that are distended; he neighbourhood of the ulcer, when one exists, is livid, ense, and shining; and the ulcer itself is indolent, and ry painful, and discharges a thin sanies. This state can be treated only by the same remedies as the preceding, but, though commonly overlooked, it is by far the more mischievous disease of the two.

Varicose affection of the veins of the spermatic cord constitutes the disease named varicocele; and that of the veins of the rectum, or skin around it, forms hemorrhoids, or piles. In these, and in all the other cases, the blood is apt to stagnate in the dilated veins, and to coagulate within them. The clots thus formed may assume a definite form, becoming elliptical, or more often elliptical with pointed extremities, and the fibrine in them arranges itself in concentric layers: after this they harden, and one of their extremities becoming connected with the walls of the vessel, small blood-vessels may form in them, and communicate with those of the surrounding parts. Lastly, the colouring-matter of the blood is removed, and earthy matter is deposited in the clots, arranged in concentric layers, and giving them considerable hardness: thus *phlebo-lithes*, or vein-stones are formed. They are usually spherical, measuring from one to four lines in diameter, lying loose within the veins, and producing no apparent inconvenience, except by obstructing the passage of blood. They are especially common in the dilated veins in the pelvis of old persons, and in veins of the legs which have been long varicose: they neither need nor admit of surgical treatment.

That which is particularly termed a *Varix* is either a mass of dilated and tortuous veins, or a single saccular and circumscribed dilatation of a vein, analogous to the circumscribed aneurism of an artery. This circumscribed dilatation is a very rare disease, but in its consequences does not differ from ordinary dilatation. An aneurismal varix is produced when, a communication being made, either by a wound or by ulceration, between an artery and a vein, the latter is dilated by the force of the arterial blood into a circumscribed sac. [ANEURISM.]

The most serious disease to which the veins are subject is acute inflammation, or phlebitis. It sometimes occurs after the slight wound made in ordinary bleeding; it is more common after operations upon varicose veins; and yet more frequently occurs after amputations of the limbs. Slight cases of phlebitis not unfrequently come on, as if spontaneously, or after exposure to cold, in varicose veins. The dilated veins become hard, like knotted cords beneath the skin, and very painful; the skin around them inflames, and the parts below becomes œdematous; and sometimes a slight erysipelas spreads over the limb. Such affections are usually of little moment; leeches, rest, and external cold are sufficient to subdue the inflammation, and it often has the favourable result of obliterating the veins, and thus curing the disease by which they were previously affected.

The more severe phlebitis is a most dangerous disease. Lymph is effused into the cavity of the vein, and into the tissue of its walls, rendering them thick and hard; the vein and the tissues immediately around it become exquisitely tender, and the parts whose blood should be returned through the diseased vein are usually œdematous. In a further stage pus is effused into the cavity of the vein, and, mixing with the blood, it may pass into the general current of the circulation, though more commonly the vein is obliterated above the chiefly inflamed part by lymph deposited on its walls, and thus the passage of pus into the circulation is prevented. With the local inflammation of phlebitis a state of low typhoid fever, with muttering delirium and great exhaustion, is usually combined; and under these the patient dies.

In connection with suppurative phlebitis a condition often occurs to which the name of *purulent diathesis* has been given. Its chief characteristic is that collections of matter form coincidently in many different parts of the body, most frequently in the joints, lungs, and liver, accompanied by a kind of fever similar to that which attends phlebitis. It has been thought that this state depends on pus formed in an inflamed vein being carried into the circulation, and deposited again in some remote part; or that there is a kind of metastasis of suppuration from the vein to the parts secondarily affected. But cases occasionally happen in which all the signs of the purulent diathesis are well marked, although no vein is diseased; so that there is no necessary connection between the disease and phlebitis, although in the tendency to suppuration the veins generally take a prominent place. The most probable explanation of the disease is, that some morbid matter, such as is formed in the decomposition of the discharge from sores or wounds, is introduced into the blood, whose chemical composition it impairs, engendering a state in which pus is apt to be formed, and in which, as in typhoid fever, every function is seriously disordered.

The treatment of these cases of acute phlebitis and purulent diathesis cannot be laid down in general terms. Very commonly the former requires the coincident employment of large local bleedings, and of medicines and regimen calculated to maintain the patient's strength. The due observance of the indications for one or both of these proceedings affords the only prospect of success; but most frequently the best directed means are ineffectual.

One of the most fatal forms of phlebitis is that which affects the veins of the uterus and the neighbouring parts after labour, and which chiefly constitutes one of the diseases included under the name of puerperal fever. *Phlegmasia dolens*, or *phlegmasia alba*, is due to phlebitis of a less severe kind affecting the iliac or femoral vein, or both, and many others adjacent to them. By obliterating the venous trunks, and preventing the circulation through them, the disease gives rise to the firm œdema, accompanied by the tightness and glossy paleness of the skin of the leg and thigh, which peculiarly indicates it. It occurs sometimes, but rarely, after exposure to cold: its usual origin is in a comparatively slight inflammation of the veins of the pelvis of women during pregnancy, or after delivery, which extends from them to the veins of the lower extremity. It is attended by the same tenderness and hardness of the diseased veins as exist in other cases of phlebitis; and in its treatment, as in theirs, the general state of the patient's health, and the degree and extent of the local affection, considered together, must determine the measures to be adopted.

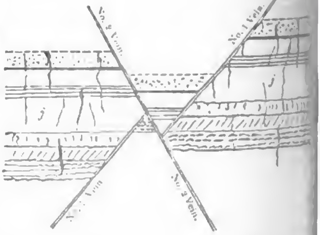
VEINS, MINERAL. The principal inorganic constituents of the crust of the earth are in general capable of arrangement as the products of water or of heat; and to each of these classes belong peculiar characteristic features of composition, aggregation, and arrangement. The products of water are mostly laid in the form of strata; the products of heat are often seen to cross, penetrate, and overlie or underlie these layers of rock, in dykes or in huge amorphous masses. But there is a third less distinctly limited class of aggregations in the crust of the earth, whose form is different from either of the preceding types, and whose origin, though perhaps not independent either of heat or water, is yet not to be understood without the consideration of other and peculiar conditions. Such are metallic and mineral veins, spar veins, and other crystallized and concretionary accumulations, common in both stratified and amorphous rocks, under a great variety of circumstances, the essential conditions of which appear however to be few in number. To ascertain these conditions is the first object of a philosophical inquiry into the origin of mineral veins; for the 'laws of the phenomena' may thus become correctly known, and the true 'theory,' the ultimate end of the inquiry, be satisfactorily indicated.

The most frequent form in which metallic and mineral veins occur is that of a vertical or slightly inclined mass, occupying what was once a fissure, or narrow open space, traversing the stratified or amorphous rocks for a variable but often considerable length horizontally, and a limited or unknown depth in a perpendicular direction. This is called a 'rake' vein. Occasionally the mineral masses are found arranged in a narrow vertical or oblique tubular form, like an irregularly expanded chimney, traversing the strata: such are sometimes called 'pipe' veins. From these two sorts of veins parts occasionally pass laterally, and are called 'flat' veins, and there are frequently ramifications from all of them, called 'strings,' and wholly or almost detached lumps, or bunches, or nests, of ore and spar, in the contiguous rocks.

Now the general 'condition' of all these occurrences is the existence, anteriorly to the accumulation of the metallic and sparry substances in the rake, pipe, flat, &c., of a *cavity* in the substance of the rocks, or a separation between the beds or blocks of stone. The same forms of occurrence belong to various spars and other substances, and the same general condition is predicable of them. That cavities really did exist in these situations, previous to the formation of the veins, is often evident from the fact that the sparry or metallic matters lie in the *interior* of closed originally hollow shells, or fill *lines of fr* and *fissure* across *corals*, *shells*, and *fishes*. (From pe observation.) It is further evident from the fact that the line of a rake-vein the strata are commonly found to have been violently displaced, and moved upwards or downwards many inches, feet, yards, or fathoms, even fifty or more fathoms, and reunited in this broken state by the subsequently introduced mineral crystallizations. This consideration supplies us with a definition of veins identical, except by the omission of the words in brackets, with that given by Werner:—'Veins are rents produced in rocks, which were afterwards filled [from above] with certain substances.' (*On Veins*, p. 57.)

In such *cavities*, spars of several kinds, as carbonate of lime, quartz, sulphate of barytes, sulphate of strontian, are frequently found, entirely unconnected with metalliferous districts, and as an usual and ordinary occurrence. In metalliferous districts the same and other minerals occur associated with carbonates, phosphates, arseniates, sulphurets, &c. of lead, iron, copper, silver, &c., in almost every proportion. Between the most valued 'mineral' vein, such perhaps as ores of precious metal, and the unprofitable masses of 'dead' spar which occur in almost every limestone-quarry, there is an almost uninterrupted gradation; they must all be taken into the inductive phenomena, as a basis of theory; yet there are peculiarities in the geographical and geological relations of the metalliferous or true mineral veins which require separate classification, and justify some special inferences touching the local conditions and geological times of their form

1. In a mining district, however rich, not all the in the rocks yield metallic minerals, even though contain spars such as often accompany these. the ores of lead, copper, silver, &c., are limited occurrence to such great fissures of the rock accompanied by displacements of the masses of bound the fissure. Thus great fissures, No. 1



the figure, which are marked by dislocations, may richly filled with valuable ones, and yet the cracks and fissures (*j*) may contain only unprof spars or thin partings of clay.

2. When, as frequently happens in mining dist veins accompanied by dislocation cross each ot veins commonly become either richer or poo and exhibit other peculiarities, about the juncti

3. Such veins which cross may be of quite natures: No. 1, for example, may yield coppe No. 2, lead ore. This difference of contents in meeting veins is even very frequently the case direction of the veins on the surface differs by a of a circle. Thus in Cornwall, veins which pas west may yield tin or copper, and those which and south produce lead. In Aldstone M running east-south-east and west-south-west are lead, those ranging north-north-west and south- are often unproductive.

4. The same veins vary in respect of the nat contents: some yielding lead or copper, and oth or tin, according to depth from the surface, t the enclosing rock, and other less known Below the surface, 100 or more yards, principally sulphuret of lead, with a variable the double sulphuret of copper and iron, surface these may be exchanged for carbonate,

arseniates of lead, carbonates of copper, and red oxide
ron. We may believe these metallic salts to be de-
d from the sulphurets by processes of change originat-
from the surface. Again, veins which cross different
s of rocks, as limestone, sandstone, and argillaceous
le, may be very rich in limestone, very poor in shale,
of variable value in sandstone. Now as the effect of
ocations in such countries is frequently to cause, on
two sides of a vein, very different beds to be on the
e level, so that limestone is opposite to shale, or to sand-
, or to the same or a different bed of limestone, the
plexity of the phenomena met with in practical mining,
n in one vein, need not surprise a prudent reasoner.
erally speaking the miner looks for a change in the
lity of the vein with every marked change of the
ading ground (or 'country,' as it is termed in Corn-
ll).

In the older rocks we see the same vein intersecting
y-slate and granite: it is itself continuous, and there
o doubt of its identity; and yet the contents of the
rt enclosed by one rock shall differ very much from
at is found in the other. In Cornwall, a vein that has
n productive of copper-ore in the clay-slate, passing
the granite becomes richer, or, what is more remark-
e, furnishes ores of the same metal differently mineral-
l. If we pursue it farther into the granite, the produce
metal frequently is found to diminish.' (Taylor, in
ort to the British Association, 1833.)

This dependence of the productiveness of veins on some
lity of the rocks which they traverse, is a phenomenon
he same order as the relation of veins in general to
icular classes of strata or particular masses of igneous
s. Dislocations of the strata occur in almost every
ict, yet it is chiefly in certain assemblages of the strata
metallic veins are abundant. In Great Britain and
nd, generally speaking, the only districts of mineral
s are situated among the antient strata; perhaps no
allic veins occur in these islands above the Palæozoic
ta (as defined in PALÆOZOIC SERIES); and though in
er parts of the world strata of much more recent origin
yield some valuable ores, it is under peculiar and
ited conditions.

Among these conditions appears to be the proximity
ocks of igneous origin. Thus, in the Pyrenees, rocks of
age of the chalk yield iron-ores near igneous rocks, and
elsewhere. On a general survey of mining districts,
out regard to their age, some relation of this kind
ears. It is near the granites of Cornwall and Brittany,
r the porphyries of Caldbeck Fells in Cumberland, near
greenstone of Aldstone Moor, that metallic veins are
dant; but on the other hand there is no metallic vein
wn in connection with the sienites of Malvern or Charn-
d, while the rich lead-mines of Flintshire and Grassing-
Moor in Yorkshire are not accompanied by traps visible
e surface, or known in the mines; and the toadstone
erbyshire has been thought to actually cut off the
l-veins. Perhaps on this important point prudence
be best satisfied by admitting the real influence of
ain igneous rocks on the productiveness of mineral
s, not merely as being of igneous origin, but as being
articular chemical qualities, and having certain definite
perties in relation to the passage of thermic and elec-
currents.

A certain relation of veins to the physical geography
e country is traceable. It is chiefly in or near to
ntainous regions that mineral veins abound; and this
ears to be mainly owing to the fact that, in such coun-
, the strata are more broken than elsewhere, and more
ded by masses and dykes of igneous rocks, circum-
ces already known to influence the occurrence of
eral veins; but several authors mistake the nature of
relation, and in particular Werner, whose treatise on
s is very valuable, attaches too much importance to it.
says, 'The occurrence of veins depends much upon the
ernal form of the mountains, on the position of the
le chain of mountains in respect to its extent and de-
ity, on the particular position of the country where
y [the mountains] occur, whether the country be
posed of hills with gentle declivities and roundish or
tish summits, or whether it be a place in a principal
ley.' (Werner, *On Veins*, p. 54.)

Before a satisfactory theory of veins can be possible, we
st possess correct general inferences on two points—the
gin of fissures and cavities in rocks, and the nature of the forces by which those fissures have been filled. Each of these points has been thought difficult of approach: the former has certainly been reached; the way to the latter is perhaps only indistinctly perceived.

Fissures and other cavities in rocks exist as effects of several natural causes, and present diverse appearances characteristic of these.

Caverns in limestone rocks are sometimes independent of real fissures, and other evidence of movements of the rocks, and may even be thought in some cases to be *original*, or left such when the rock was formed in the sea. Such cavities actually occur in modern coral reefs, left by the peculiar growth of the lithophytes: in certain cases (for instance magnesian limestone) the small cavities may have been formed by gas extricated in the course of the formation of the stone. Now in such closed cavities, large or small, the crystallizations which we find (carbonate of lime, sulphate of barytes, sulphate of strontian, quartz, oxide of iron, sulphuret of iron, &c.) are of the same kinds, and may be due to the same causes, as the crystallizations in originally hollow shells, or in the cavities left by the dissolution of these from the rocks. To the above catalogue may therefore be added sulphuret of zinc, arseniuret of iron, sulphuret of lead; for these minerals occur in the situations just named, especially near faults or veins.

Cracks, in many limestone rocks, are as perfectly internal cavities as those above named, and are, in the neighbourhood of veins or metalliferous fissures, lined with similar crystallizations, adding to the list carbonate of copper. (In magnesian limestone of Yorkshire.)

Joints are open cracks traversing beds of stone, and come under the same description as other often very large open fissures unaccompanied by dislocation. These *fissures* are often arranged with so much symmetry as to leave no doubt of the influence of polarities among the molecules of the rocks when they were formed. Joints and fissures, especially near veins, often partake of the minerals which they contain.

Faults, or fissures accompanied by dislocations, offer, in addition to all the facts already mentioned, the very important information that the crust of the earth has been broken at different times, as well as in different directions. In the drawing of two intersecting veins, which illustrates this article, it will be seen that the vein No. 2 cuts through and displaces the strata, which had been already broken and displaced by the vein No. 1. The relative antiquity of these two veins has been generally allowed to be in the order of the numbers. Now as the metalliferous contents of the fissures No. 1 are divided by No. 2, as well as the strata which bound it, there appears reason to conclude that the vein No. 1 was filled with its mineral contents before the disturbance of the ground by the fissure No. 2.

We are thus conducted to the remaining part of the general inquiry proposed, namely, the causes concerned in filling the cavities of all kinds, already classed. The evidence of the dislocation of strata on the sides of most mineral veins leads, when generalized, to the recognition of several systems of veins, even in one district, of unequal antiquity. It is also found that these systems pass in different directions respectively, one set E.N.E., another N.N.W., others to intermediate points; and further, there are observed in these systems of veins—unlike in direction, and unequal in antiquity—some general and characteristic differences in the contents of the veins.

Werner gives eight successive systems of veins in the Freyberg mines; but the definitions are far from clear. M. Carne gives eight successive groups of veins and slides in Cornwall, more neatly characterised; the oldest are tin veins (lodes), underlying (dipping) to the north, ranging nearly E. and W. by compass. The second are tin veins, underlying to the south, ranging E. and W. nearly (by compass). The third class includes east and west copper veins. The fourth are diagonal (or contra) veins, ranging N.W. and S.E., and yield copper. The fifth class includes *cross courses*, ranging N.N.W. and S.S.E., and rarely yielding metal, except lead. A sixth group yields copper. A seventh includes 'cross flukans' (clay veins), ranging nearly N. and S., and an eighth, the 'slides,' which are formed of soft clay, and cut through all the others.

This classification, though too hard and precise for exact adaptation to nature, is valuable as an index to many complicated phenomena; but the relative antiquity of many sets of fractures is a difficult problem, requiring much mechanical science, and a knowledge of the relative hardness and resisting power of the masses broken. Sir H. De la Beche has shown (*Ordnance Report on the Geology of Cornwall*, &c., p. 299) a simple case of this nature, in which the intersecting elvan dyke is probably not the newest of the two fractures. In the elaborate volume just quoted the reader will find a vast body of digested information regarding the phenomena of the Cornish and Devon mineral veins. As a combined result, we find in the veins of Cornwall a manifest tendency to two sets, one (the oldest) E.N.E. yielding most of the ores, the other N.N.W., *crossing* the preceding almost from sea to sea. In Devonshire also two sets appear, one (the oldest) nearly E. and W., yielding most of the ores, the other N. and S., *crossing* the other. Continuing the investigation, we find this system of *cross* courses (ranging N. and S.) extended into Dorsetshire, and there dividing the chalk, so that a comparatively recent geological date for some of the great cross courses of Devon and Cornwall may be probably inferred. Adopting the views of this author, we find evidence of four systems of east and west fractures in the district of Cornwall and Devon. 1, That of the upheaval of granite, and the arrangement of the strikes of the beds of slate. 2, The elvan (porphyry) courses, which traverse alike the granite and the strata disturbed with it. 3, The east and west systems of veins. 4, The system (indistinctly traced) of east and west clay-slides; and adding to them the north and south traps, elvans, cross courses, and flukans, we see clearly how many and various have been the fractures and fissures, and how complicated the conditions under which these fissures were stored with their contents. What was the agency by which this was accomplished?

Werner (1791) believed that fissures were filled *from above*, by precipitations of earthy and metallic salts held in *solution by water*. As some of the substances common in mineral veins are not known to be soluble in water, separately or in combination, we can only adopt this view upon the supposition that the crystallizations in veins are the result of double decompositions in the liquid: nor even with this aid is the process at all clear by which the metallic masses were formed.

Lehman had previously (1753) introduced the notion of *sublimed vapours* and exhalations; and if we believe that sulphuretted hydrogen gas was abundant in these, the formation of sulphurets from salts of lead, copper, &c. might become a possible case. Necker revived this idea. (*Geol. Soc. Abstracts*, 1832.) Dr. Hutton and Playfair maintained that the vein-spars and metallic ores were injected into fissures, not in a state of solution in water, but in a state of *fusion through heat*. They were a sort of metalliferous dykes.

In consequence of the experiments of Mr. Fox, which show in certain cases the passage of electrical currents between different parts of the metalliferous veins of Cornwall, and an augmentation of temperature in them as we descend into the earth, a fourth general view has gradually and obscurely grown up to importance. In this view *electrical forces* are appealed to for determining the deposition of matter brought into the fissures by water operating on metallic aggregations, at great depths and under considerable heat. Such heated waters would circulate upwards and downwards in the open spaces of the rocks: in the upper parts of the fissures they would be cooled, and might deposit parts of their dissolved contents: these would be arranged by electrical affinities under the influence of the various nature, direction, and fissuring of the rocks.

Such affinities might be dependent on *local electrical currents*, generated by the local differences of the rocks and minerals, or on the *general terrestrial currents* which govern common magnetism, or on a combination or opposition of these. Under any circumstances, evidence of these *general currents* must be looked for in the *general phenomena*, and the *local currents* must be sought in the *local phenomena*. Adopting this theory as at least partially true, we may venture to refer to general currents the remarkable fact of the frequent arrangement of metals in east and west veins, or in veins pointing a little north or a little south of east and west; for within such limits in European and Mexican latitudes these general electrical currents may be conceived to pass, varying most in Europe, according as the polarities varied from time to time. We may refer to local currents the limitation (which is seldom really, though often in appearance, arbitrary) of the metallic contents of a vein to particular adjacent rocks, to particular oblique parallel shoots or pipes, to particular sides or ends of a vein, to particular depths, or particular nidiform masses. To a succession of such operations we may refer the successive vertical lamination of several sorts of crystals (fluor, carbonate of barytes, lead-ore, blende, &c.) in the same vein; and after a principal vein was partially filled, we may conceive without difficulty the deposition of nearly similar contents in neighbouring fissures or joints, or even closed cavities, if these should then become the lines of easiest electrical conduction.

The reader will find a comprehensive view of this hypothesis compared with characteristic phenomena in the Ordnance Report on Dover and Cornwall. Indeed any thing approaching to the strict and severe process of deductive reasoning from known physical truths, applied to conditions like those ascertained in the districts of Cornwall and Aldstone Moor, has been hardly attempted elsewhere. Yet the occasion is favourable. Sir H. De la Beche has embodied a vast mass of available results in the Report already quoted. Mr. Fox has experimentally almost *made* mineral veins by imitating the natural arrangements of the rocks of Cornwall: the electrotype process is daily revealing new and unexpected phenomena of electrical transfer under manageable conditions; and there are these great inducements for an earnest general investigation of the whole subject, that in the first place crystallography and the doctrines of molecular forces would assuredly be advanced by it; and, what is still more important, laws of judgment and practice in mining operations would be satisfactorily established and confidently applied to cases entirely beyond the range of ordinary experience. We must however caution the reader who prefers this view of the origin of veins against any contemptuous disregard of the opinions of Werner, Lehman, and Hutton, on the ground of special difficulties in regard to solution in water, sublimations of vapours, or igneous fusion of minerals. There is abundance of facts known to rescue their speculations from a hasty charge of *absurdity*; there are many insulated facts which seem to agree with them; and at all events the descriptions furnished by Pryce, Werner, Carne, Fournet, Fox, Henwood, Taylor, and De la Beche, must be carefully and respectfully considered, and combined with the general laws of the earth's structure and established principles of physics, *before we can judge of a theory of mineral veins.*

(See further—Pryce, *Mineralogia Cornubiensis*; Werner, *On Veins*, 1791—English edition, 1809; Hutton, Carne, Davy, and others, in *Transactions of the Geological Society of Cornwall;* Williams's *Mineral Kingdom*; Fournet, in D'Aubuisson's *Geology*, vol. iii.; Fox, *Proceedings of Polytechnic Society:* Henwood and in *Abstracts of Geological Society of London*, 1832; in *Report to British Association*, 1833; Becquerel, *d'Electricité*, 1835; Murchison's *Silurian System*; Phillips, in Lardner's *Cyclopædia*, 1839; De la Beche, Ordnance *Report on Cornwall, Devon, and West Somerset*, 1839.)

VELANI, or **VALONIA**. [Quercus, p. 214.]

VELATES. [Turbinidæ, vol. xxv., p. 383.]

VELAY, or **VELLAI, LE**, one of the provinces of the government of Languedoc in France. It was bounded on the north by Le Forez, a subdivision of the government of Le Lyonais; on the east and south by Le Vivarais, or Vivarez, and on the south-west by Le Gévaudan, both provinces of Languedoc; and on the north-west by Auvergne. It is now wholly included in the department of Haute Loire, under which it is described. [Loire, Haute.] We have here only to notice that the geological features of this district and those of the adjacent tracts, comprehended in the province of Vivarais (now the department of Ardèche), are very similar, consisting of a high table-land of primitive rocks, such as granite, gneiss, mica-slate, &c., intermingled with volcanic formations which constitute lofty mountain-masses, and overlaid towards the deep valley of the Rhône, in the eastern part of Le Vivarais, by a red-sandstone, probably corresponding to the old red-sandstone of England; by the carboniferous rocks, and the Jura limestone; and in some part of the valley of the Loire by tertiary formations. The volcanic formations are considered by Mr. Scrope as belonging to two distinct periods: those of the first period having been produced by volcanoes in habitual activity, which had severally a single focus of activity, and formed in consequence a few distinct and lofty mountain-roups; those of the second period being scattered over a rger surface, and appearing to have resulted from a series single eruptions successively occurring at different ints. Mount Mezene, one of the great centres of vol- nic action in the first period, is on the south-eastern rder of Le Velay, towards Le Vivarais. Le Velay de- es its name from the Vellavi, the Celtic nation by whom was inhabited. Le Puy was its chief town. [PUY, LE.] crope's *Memoir on the Geology of Central France.*)

VELA'ZQUEZ, DIE'GO RODRIGUEZ DE SILVA Y. lázquez was born at Seville, and baptized there June 6, 99. His parents, on the father's side, were of Portu- ese origin. Having manifested, while yet a child, a de- led turn for drawing, he was placed under Francisco rrera el Viejo. This master, harsh, violent, and ex- vagant as a man, was an artist of great native power, ldness, and originality; his paintings were true expo- nts of his character. He first broke down the timid and nventional style of the Sevillians, who hitherto had fol- wed in the manner of the Italians: to obtain effects true nature was his ambition, and for this end he despised means d materials alike, working with the coarsest colours, and ing brushes of an unusual length. The principles of his ethod and handling are to be traced in all the works of s pupil, improved indeed by a higher quality of touch d intention. Velázquez, who was of a gentle disposi- n, was driven by ill usage from this studio, and entered at of Francisco Pacheco, who was the very opposite of rrera. This féeble creature of rules was cold in colour d commonplace in conception, yet learned in the theory art, and better known by the works ot his pen than of pencil: he exercised no influence whatever over the le of his scholar, who soon discovered that his new mas- could not give him that which he felt was wanting. ter five years' nominal instruction, Velázquez married ana, Pacheco's daughter; and this explains his long con- nance under an otherwise unprofitable roof. Disap- inted in his master, and thrown on himself, the young tist turned to Nature for his guide, and he followed her ithfully to the end. He procured a peasant lad for a odel, and painted him—his commonplace forms, rags, d nakedness, under every aspect and attitude. Neces- y thus did for him what choice had done for Caravaggio, e leader of the naturalist school in Italy, who, in opposi- n to the classicists, painted men and things as they were, her than as they ought to be; preferring the forcible, ective, and even the low, if real, to the refined, ideal and etical. The early impression made on Velázquez was ep and indelible; it became the blemish of his style; nassed the man throughout life, and warped him from ffaelle and Michael Angelo to Ribera and Stanzioni: e study of this plebeian model was moreover cognate to process which Herrera first adopted for himself, and n pointed out to all his scholars. It forms a peculiarity the system of the great school of Seville, and especially Velázquez and Murillo, two of its brightest ornaments; y were taught to draw and to colour at the same time, ginning with subjects of still-life, and those the most linary, such as meat, vegetables, and kitchen utensils: ice the generic term *Bodegones*, by which they are still own. Thus Velázquez obtained an early mastery over materials, a habit of close imitation, and a marvellous wer of representing nature and texture. His first at- npts at pictures, properly speaking, were either copies m Ribera, or compositions painted with his decided l hard outline, and his strongly contrasted lights and dows. His pictures of this period are very scarce; ny probably exist, but remain unknown from being ribed to other artists. The Adoration of the Shepherds, w in the Louvre, is the earliest of his undoubted pro- ctions, and it is nothing more than a copy from Spagno- to.

Arrived at the age of twenty-three, some paintings of is Tristan, whose style was a compound of Titian and Greco, inspired Velázquez with a burning desire to see e works of these and other masters, and he left Seville Madrid in the spring of 1622: he was welcomed by on Juan Fonseca and other Sevillians, who were settled the capital, who befriended their countryman with that irit of localism and clanship which is the characteristic all Spaniards. Velazquez, having painted the portrait the poet Gongora, which was a commission from Pa- ieco, returned to Seville; meanwhile the influence of Fonseca was not idle, and the young man was recalled to Madrid, the next year, by the Conde Duque de Olivares, the ruler of Spain, who was to Philip IV. what Buckingham was to our Charles I., prime minister of the tastes and pleasures of his master. Velázquez, having painted the great man's portrait, stepped at once into fame and fashion, which never deserted him during his long career of prosperity. He maintained by merit the start which was procured by favour; nor can there be a greater proof of the high degree of excellence to which he had already arrived than his immediate success.

Philip IV., a true judge of art, on seeing the portrait of the favourite, sat at once for his own. At this the critical moment of his fortunes the young artist put forth all his strength. The picture was exhibited in Madrid, near the steps of San Felipé; and there, in the open air, did Velázquez, like the painters of Greece, listen to the praises of a delighted public. He was forthwith appointed the court painter; and Philip, apeing Alexander, according to the story in Horace, ordained that none but this new Apelles should portray him. The necessity of frequently painting the 'foolish hanging of the nether lip' of this dull ungainly Austrian and his family was little calculated to correct a tendency to unworthy form, which was engendered by the ordinary model of his early studies. This was again fixed by the constant introduction of hideous dwarfs, those abortions of nature, and playthings of the kings and princes of Spain.

Meanwhile the more he painted, the more Velázquez was honoured by his own and foreign princes, and particularly by our Charles I., who was at Madrid in 1623. His portrait, begun by Velázquez, was never finished, and has unfortunately been lost. Another illustrious visitor soon after became his friend, Rubens, who arrived at Madrid, August 6, 1628, rather in the character of a diplomatist than a painter: indeed he associated with none of the artists except Velázquez, with whom alone he went to the Escurial. Rubens left Madrid, April 26, 1629, and although he was constantly painting during his sojourn, he wrought no change either in composition or colouring in Velázquez, who was accustomed to look at nature with his own eyes and not through those of other men; nor indeed had the gorgeous tints and flabby fleshiness of the Fleming anything in common with the sober draperies of the sinewy Castilian: it was the barb of Arabia compared to a cart-mare of Flanders.

Velázquez at last obtained the royal permission to go to Italy, and he embarked at Barcelona, August 10, 1629. He visited Venice, Ferrara, and Rome, being everywhere received in an artistical triumph. Urban VIII. assigned to him an apartment in the Vatican, where he diligently copied Raphael and Michael Angelo; but neither the grandiose design and sublimity of the one, nor the sentiment and ideal beauty of the other, ever produced the slightest change in the Spaniard's style. Indeed, like our Sir Joshua Reynolds, he felt and studied their brightness without ever reflecting in his own works one single ray. Velázquez, like his friend Lope de Vega, held up the mirror to his own age alone: he called up no recollections of the past, borrowed from no other period or country, and none can claim anything back from him; all was his own, original, national, and idiosyncratic; and he shrunk from any change by which loss might be risked. The Spaniard is neither a friend to the foreigner nor to his innovations. Nor was Italy then what she had been; the préstige of her example had passed away with the age of Leo X., and the vitality of her soil for new excellence was dull when compared to the fierce energy of unexhausted Spain, then starting into a life of her own. Velázquez and Murillo were destined to revive the arts, which declined in Italy, as Seneca, Martial, and Lucan had renewed the literature of Rome in her period of decay.

From the Vatican Velázquez removed to the Villa de' Medici, but falling a victim to malaria, was soon carried down an invalid to the Piazza de Spagna below, and lodged in the palace of the Condé de Monterey, the ambassador of Spain. The ambassador was a patron of art and artists, both from real taste and the diplomatic anxiety to second the ruling object of his king. He watched over his patient and restored him to health. Velázquez remained a year in Rome; he only sent home two original pictures, his Jacob with the Garment of Joseph, and Apollo at the Forge of Vulcan; both are now at Madrid, and in spite of much truth, character, and powerful painting, are singularly marked with most ordinary forms. The children of Jacob are the kinsmen of the model peasant, and Vulcan is a mere farrier, and his assistants brawny Gallicians. It would seem that the Spaniard, to prove his independence, had lowered his lowest transcript of nature to brave the ideal and divine under the shadow of Raphael himself.

From Rome he passed to Naples, then a Spanish possession, where he felt at home amid the works of Caravaggio, Stanzioni, and Ribera. With Ribera, his countryman, he lived in closest intimacy, preferring however to his harder style and blood-boltered subjects the flowing touch and cheerful composition of Stanzioni, between whose style and his own the resemblance cannot be mistaken. This artist, called in Spain el Caballero Maximo, was the type of the Hispano-Neapolitan school; many of his finest pictures were purchased by Velázquez for Philip IV., and, hung as they are near his own in the gallery of Madrid, abound in analogies of touch and method.

Velázquez returned to Madrid early in 1631, and being necessary to the amusement of his patron found himself not forgotten: the king, with a fidelity which was no part of his nature, had never during his absence sat to any other painter. Philip, imitating Urban VIII., gave him a painting-room in the palace, and came daily to watch his progress.

It is to the credit of the Austrian dynasty that they relaxed in favour of the fine arts the rigid ceremonial of Spanish etiquette. Charles V. made a friend of Titian; and Philip II., of Herrera the architect. Velázquez now painted the magnificent equestrian portrait of Philip IV., from which the great carver Montañez made a model in wood, in order to be sent to Florence, where it was cast in bronze by Pedro Tacca, and now exists in the gardens of the Buen Retiro. The success led to new honours: Velázquez was appointed to an office about the king's person, and in that capacity followed Philip into Aragon and Catalonia in 1643 and 1644. The former of these years witnessed the disgrace of the Conde Duque, to whom, although fallen, Velázquez had the boldness to continue to show respect; nor did Philip IV. resent this uncourtierlike gratitude. In November, 1648, Velázquez made a second journey into Italy, in order to purchase modern pictures for the king, and procure moulds from the best antique statues for a projected academy. He embarked at Malaga, landed at Genoa, passed rapidly to Milan, Venice, Florence, and Parma, and thence hastened to embrace his well-beloved Ribera at Naples. Returning to Rome he was presented to Innocent X., whose portrait he painted, which is now the gem of the Doria collection, and the only real specimen of his art in Rome. He was elected a member of the Academy of St. Luke. He remained in Italy almost a year, purchasing rather than painting pictures, and busy with his casts from Greek sculpture. He fully felt the value of exquisite form, of which he had known the want; and ever in after-life strongly urged all young artists, Murillo particularly, to complete their studies in Italy. Spain always was, and is, very deficient in fine antique marbles, for which the Spaniards have little taste. Their church preferred the relic of a monk to a statue by Phidias, in which they only saw a pagan idol. Their Inquisition persecuted nudity, the essence of Greek art, and employed artists to clothe the least exposure either in painting or sculpture; hence the draped character of the Spanish school, of which the clergy have been the best patrons, not for the sake of art, but as a means of extending their own influence. Painting took the veil of the nun, Sculpture the cowl of the monk; but Philip, lax and voluptuous, protected the licence of Greece and Italy, and Velázquez felt that the chance might never recur: the casts were made, which after the king's death were neglected, injured, and finally lost.

Velázquez returned to Madrid in June, 1651. He was now in his full power, and painted his finest pictures. In 1656 he received the much-coveted cross of Santiago, which the king drew in with his own hand on a portrait of Velázquez, painted by the artist himself. The nobles resented this profanation of a decoration given hitherto only to high birth; nor were the difficulties removed without a papal dispensation and a royal grant of Hidalguia.

About this time Velázquez was raised to the lucrative and honourable post of Aposentador Mayor. His duties were to superintend the personal lodgment of the king during his frequent migrations. This much-envied office robbed Velázquez of his time, precious to art, and eventually of life itself. He was sent in 1660 to prepare the royal quarters during the journey from Madrid through the ill-provided Castiles to the Bidassoa. He erected in the Island of Pheasants the temporary saloons wherein the conferences were held which terminated in the marriage of the Infanta Maria Teresa with Louis XIV., a marriage fatal to the future weal and independence of Spain as to Velázquez, who here appeared almost for the last time, remarkable among the noble crowd for his tasteful costume and arrangement of diamonds. He returned to Madrid, July 31, worn with over-fatigue in preparations which any lord of the bedchamber might have superintended. He died one week afterwards, on the 7th of August, 1660, and was buried with great pomp in the church of San Juan. In seven days his wife, broken-hearted at his loss, followed her gentle and excellent husband, and was laid by his side in the same grave. No monument has ever been erected to her greatest artist by Spain, always ungrateful to those who have served her best; nor did the influence of Velázquez survive him; his pupils and imitators were few. Spain was hastening rapidly to her fall, which was consummated by the Bourbon succession, when French tastes were substituted for Spanish in art and literature.

Such is the unimportant biography of a man whose name is now immortal, of whom, like Lope de Vega, all talk familiarly, although most imperfectly acquainted with his real works. His genuine and finest works remain at Madrid: in other cities of Spain they are quite as rare as in every other part of the world; and the reasons are obvious. Velázquez commenced his career as painter to the king; he rarely condescended to work for the Church or private patrons; all his great pictures were thus monopolized, and hung in the royal palaces, and thus were inaccessible to purchasers, and seldom seen even by the few travellers who visited Spain. Neither were they scattered abroad in the wreck which ensued at the French invasion. In the universal rapine, by which the works of many Spanish artists, whose names previously were almost unknown in Europe, were first ushered into notice, Velázquez formed an exception. His paintings hung in the royal residences were respected even by marshals, as passing with the crown from the legitimate dynasty to the intrusive. Two only were sent to Paris, and these were the Jacob and the Philip IV. on horseback, pictures selected more from their historical than intrinsic interest. In truth the French never have appreciated Velázquez; a taste depraved by the vain tinsel of the empirical, unnatural David could not feel the grave repose and sober simplicity of the proud Spaniard. It is impossible to estimate Velázquez without going to Madrid; on seeing him in this, the richest gallery in the whole world, the first impression of his masculine power and universality of talent is irresistible: it is the reality more than the imitation of life and nature, in every varied form. He is the Shakspere of his art, a Proteus. Grievous is the error of those who suppose him only to be the portrait-painter of sallow mustachioed Spaniards in black cloaks. There is no branch of the art, except the marine, which he has not pursued, and he attained almost equal excellence in all.

His portraits baffle description and praise; they must be seen: he elevated that humble branch to the dignity of history. He drew the minds of men: they live, breathe, and seem ready to walk out of the frames. His power of painting circumambient air, his knowledge of lineal and aërial perspective, the gradation of tones in light, shadow, and colour, give an absolute concavity to the flat surface of his canvas; we look into space, into a room, into the reflection of a mirror. The freshness, individuality, and identity of every person are quite startling; nor can we doubt the anecdote related of Philip IV., who, mistaking for the man the portrait of Admiral Pareja in a dark corner of Velázquez's room, exclaimed, he had been ordered to sea, 'What! still here?' After a few days spent in the gallery of Madrid, we fancy that we have actually been acquainted with the royal family and court of that day, and that we have lived with them. None perhaps but a Spaniard could so truly paint the Castilian. Velázquez the Vandyck of Madrid. He caught the high-bred of the Hidalgo, his grave demeanour and severe cos- e, with an excellence equal to his Flemish rival, differ- only in degree; he was less fortunate in model. Van- e, like Zeuxis, had the selection of the most beauteous s, faces, and apparel, in the English court of Charles, h he was created expressly to delineate, with his clear, ry, and transparent tones, his elegant aristocratic air, e delicate skins, and tapering fingers which are never in coarse, tawny Spain; nor did Velázquez ever con- end to flatter even royalty:—honesty was his policy. ourts could not make a courtier of his practical genius, h saw everything as it really was, and his hand, that ed his intellect, gave the exact form and pressure: he ly refined. He did not stoop to conciliate and woo spectator. Thus even when displeased with repulsive ects, we submit to the power of a master-mind dis- ed in the representation.

is Infantes are often booby-faced, and his Infantas aly; for the royal originals were made, not by him, but Nature's journeymen: still they are real beings, not con- tional; they are flesh and blood, our fellow-creatures, with them therefore we sympathize. Their costume, ether of the court or the chase, is equally true; and y wear their clothes with ease and fitness, not like fancy masquerade of an imaginative painter, stuck a stiff lay-figure, but the every-day dresses of living ible bodies underneath. Velázquez was inferior to dyck in representing female beauty; for he had his advantages: the Oriental jealousy of the Spaniard olted at any female portraiture, and still more at display of beauteous form: the royal ladies, almost only exception, were unworthy models, while the of rouge disfigured their faces, and the enormous ticoats masked their proportions. Velázquez was phatically a man, and the painter of men. He was are of his strength and weakness: his greatest works— s Lanzas, Los Bebidores—have no women in them atever; and in the *Hilanderas*, a group of females, he s turned aside the principal head in the foreground, aving it, like Timanthes, to be supplied by the imagination of the spectator. He was moreover a painter only of e visible tangible beings on earth, not the mystical glo- fied spirits of heaven: he could not conceive the incon- ivable, nor define the indefinite. He required to touch fore he could believe—a fulcrum for his mighty lever: could not escape from humanity, nor soar above the uds: he was somewhat deficient in 'creative power:' was neither a poet nor an enthusiast; Nature was his ide, truth his delight, man his model. No Virgin ever scended into his studio; no cherubs hovered around his llet: he did not work for priest or ecstatic anchorite, t for plumed kings and booted knights; hence the glect and partial failure of his holy and mythological tures—holy, like those of Caravaggio, in nothing but me: groups rather of low life, and that so truly painted, still more to mar, by a treatment not in harmony with subject, the elevated sentiment: his Mars is a mere rder; his demigods, vulgar Gallicians; his Virgin, a itornes, without the womanly tenderness of Murillo, unspotted loveliness of Raphael, or the serenity, un- fled by earthly passions, of the antique. He rather vered heaven to earth, than raised earth to heaven. His tures however of this class are very few, and therein is marked difference from all other Spanish artists, who, inting for the church, comparatively neglected every- ing but the religious and legendary.

In things mortal and touching man Velázquez was more an mortal: he is perfect throughout, whether painting gh or low, rich or poor, young or old, human, animal, or atural objects. His dogs are equal to Snyders; his argers to Rubens—they know their rider. When Ve- zquez descended from heroes, his beggars and urchins valled Murillo: no Teniers or Hogarth ever came up to e waggish wassail of his drunkards. He is by far the rst landscape painter of Spain: his scenes are full of ocal colour, freshness, and daylight, whether verdurous ourt-like avenues or wild rocky solitudes: his historical ictures are pearls of great price; never were knights and oldiers so painted as in his surrender of Breda.

His style was based on Herrera, Caravaggio, Ribera, and Stanzioni; a compound of all, not a servile imitation f any. His drawing was admirable, correct, and unconstrained; his mastery over his materials unequalled; his colouring was clear and clean; he seldom used mixed tints; he painted with long brushes, and often as coarsely as floor-cloth; but the effects when seen from the intended distance were magical, everything coming out into its proper place, form, and tone. Yet no man was ever more sparing of colour; he husbanded his whites and even his yellows, which tell up sparkling like gold on his undertoned backgrounds: these, especially in his landscapes, were cool greys, skies, and misty mornings—nature seen with the intervention of air. He painted with a rapid, flowing, and certain brush, with that ease, the test of perfection, that absence of art and effort, which made all imagine that they could do the same—until they tried, failed, and despaired. The results obtained are so true to nature, that first beholders, as with Raphael at the Vatican, are sometimes disappointed that there is nothing more. He was above all tricks. There is no masking poverty of hand or mind under meretricious glitter; all is sober, real, and sterling. He conceived his idea, worked it rapidly out, taking advantage of everything as it turned up, correcting and improving as he went on, knowing what he wanted and—which few do—when he had got it: then he left off, and never frittered away his breadth or emphatic effect by superfluous finish to mere accessories; these were dashed in *con quatro botti*—but true, for he never put brush to canvas without an intention and meaning. No painter was ever more *objective*. There is no showing off of the artist, no calling attention to the performer's dexterity: his mind was in his subject, into which he passed his whole soul; loving art for itself, without one disturbing thought of self. He was true throughout to Nature, and she was true to him, and has rewarded him with immortality, which she confers only on those who worship with undivided allegiance at her shrine.

(Cean Bermudez; Pacheco; Carducho; Ponz; Mengs.)

VELEIA, an antient city at the base of the Apennines, 23½ miles south from Piacenza and 45 miles from Parma by the existing roads. Veleia stands with regard to these two cities at the apex of a triangle, of which a line drawn from Parma to Piacenza would be the base.

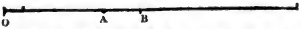
According to Bardetti, the population of this part of Italy was brought under the Roman dominion in A.U.C. 595, by M. Fulvius Nobilior. The inhabitants of Veleia up to the fourth year of the reign of Tiberius lived in villages; but a town was formed subsequently, which became a municipium, probably between the fourth year of the reign of Tiberius and the eighth of Vespasian. The inscription showing that Veleia was a municipality reads—

BAEBIA.T.F BASILLA . CALCHIDICVM . MVNICIPIBVS . SVIS . DEDIT.

From the rude remains of antiquity, as well as the exquisite works in marble and bronze discovered in the forum and in the foundations of the surrounding buildings, it would appear that the rude arts of the old town had been supplanted by the better taste of the period in which it was changed into a municipality. The period of the ruin of Veleia is not by any means accurately known, though it is conjectured by Pittarelli to have taken place in the fourth century of the Christian æra. This conjecture, which has much probability, is founded on the fact that coins of a later period have not yet been discovered in the excavations which have been made on the site of Veleia.

History does not mention the event which appears to have brought a sudden ruin on a prosperous municipality. Tradition reports a slip of the mountains called Moria and Rovinazzo to have been the cause of the catastrophe which most probably buried the city unexpectedly. According to Antolini, this event was owing to the waters of a small lake, enclosed high up in the mountains of Moria and Rovinazzo, two miles from the city, having percolated through the schistose layers of the mountains: the consequence of which was that a large portion of earth and rock became detached and rolled over the city. This opinion appears to be well founded, as in the mountains above mentioned there is a concave valley like the basin of a lake with one side broken down, and the materials which cover the town are of the same nature as those of the mountains Moria and Rovinazzo. Some have erroneously supposed the ruin to have been caused by a volcano, because at a short distance from the forum there are two natural fires arising from the carriage moves 'faster' than the old stage-coach, or that two bodies which set out together and keep together are always moving 'at the same rate,' there is no need of explanation of the words which are in marks of quotation. And we must now refer to the considerations in UNIFORM as a constituent part of this article, showing that we may have a perfect idea, both of velocity, that it is a magnitude, and that there is such a thing as uniform velocity, previous to any definite ideas of the most proper mode of measuring even that uniform velocity, to go no farther.

If a body move uniformly, it is customary at once to lay down as the measure of the velocity the space described in a given time, usually the unit of time, a second, a minute, an hour, as the case may be. As far as the great object of calculation is concerned, this definition is perfect: by instituting measures of velocity, we can but want to answer one or other of these questions: Where will the moving point be at the end of a given time; or, In what time will the moving point pass over a given length. The body moves at the rate of v feet per second, it moves over vt feet in t seconds, and moves over the length s feet in $s \div v$ seconds. Let us now take a point moving with a variable motion, that is, not describing equal lengths in equal times, say a particle descending by its own weight in a vacuum. In the first second it falls 16 feet; but in the first half of this second it falls only 4 feet, and the remaining 12 feet in the second half-second. The space described in one second is therefore no measure of the rate of motion during that second, and it is now to be asked, What is the way of obtaining a measure of the speed after any interval has elapsed? What is velocity itself, when it cannot, for want of uniformity, be ascertained by the space described in any given time? If the action of gravity were removed at the end of that time, so that the point would go on uniformly with its last acquired velocity, how much would it then describe in one second? All these questions are the same, and the answer cannot be given without the introduction of the notion of a limit, whether with or without the forms of the differential calculus. At the end of the time t seconds, let the moving point be at A, distant by s feet from the fixed point O.



During the ensuing fraction h of a second, let it describe the further space AB $(=k)$. The length k is then moved over in the time h, and, if the velocity were uniform, that velocity would be $k \div h$ feet in one second; for as h is to 1 (second), so (on the supposition of uniform velocity) is k to the space which would be described in one second. If AB were very small, we might reason (with tolerable exactness) as follows: in a very small time the change of speed will be slight, and the motion of the point nearly uniform, though not absolutely so; whence we may say, without material error, that AB is described as with a uniform velocity of $k \div h$ feet per second. The process which the mathematician adds is the following:—The error of the preceding process, small when h is small, becomes smaller when h is still smaller, and may be diminished to any extent: that is, little as may be the departure from uniform motion in moving through a small length, it is less in moving through a smaller. If, then, instead of making h simply small, and then finding $k \div h$, we diminish h without limit, and find the limit towards which $k \div h$ approaches, we find that uniform velocity which may be said to represent the speed of the point in passing through A, so far as any uniform velocity can be said to do so. Using such language as supposes the point to have volition, we have, in the limit of $k \div h$, the length per second with which the point shows an intention of proceeding at the instant when it passes through A, though it does not preserve that intention wholly unaltered for any portion of time, however small.

Suppose for example that the point moves in such a way as to describe $t+t^2$ feet in t seconds, for all values of t, whole or fractional. We have then $s=t+t^2$, $s+k=(t+h)+(t+h)^2$, whence we obtain

$$k=h+2th+h^2 \qquad \frac{k}{h}=1+2t+h.$$

At the end of 3 seconds, what is the velocity? Judging from the length described during the succeeding fraction h (and making $t=3$), we should say that, $k \div h$ being $7+h$, the limit of this, or 7, obtained by diminishing without limit, is the velocity required; that is, the is then moving 7 feet per second. If we suppose per second, the length described in the fraction second is the fraction $7h$ of a foot; take any other velocity p feet per second, and ph is the length described in the same time. Now what is really described is $7h$ so that the errors are h^2 and $(7-p)\,h+h^2$, which the ratio of h to $7-p+h$. Now if p differ (as we supposed) from 7, the first error diminishes without as compared with the second, when h diminishes limit: so that, *of all uniform velocities*, 7 feet per is the one which best represents the motion of the in any small time following the end of the third and the better the smaller the time.

It appears then that we do not, properly speaking, take to say at what rate the point is moving at the three seconds, but what fictitious *uniform* rate best sents, at the instant, the *variable* rate at which it is This will, for a moment, seem rather unsatisfactory student who imagines that he has got an absolute velocity, and here he should compare his notion subject with that of the direction of a point curve. [DIRECTION; TANGENT.] What do we saying that a point which moves in a curve has, instant, the direction of motion which is repre the tangent of that curve? Answer, in nearly word as before, We do not, properly speaking, to say in what direction the point is moving at any of its motion, but what fictitious *line of uniform* (straight line) best represents, at that instant, the *variable direction* (curve) on which it is moving. study of these two things together, velocity and useful, as each throws illustration upon the difficulties other. In both cases the laws of matter agree in that which is indicated as most simple by the laws for if a point moving along a curve be suddenly of the forces which keep it in a perpetual change and direction, it will proceed with that very velocity we have said it shows its intention to proceed formly; and will quit the curve for that straight we might equally well have said it showed a dispo prefer to any other while moving on the curve, the tangent of the curve.

If it should be said that we are reduced, in variable velocities, to a necessity which does not describing those which are uniform, namely, the limits, we altogether deny the fact: that is, we we are as much compelled to the use of limits in a uniform velocity, as a variable one. For what uniform velocity mean? A point has uniform when equal spaces, any equal spaces whatsoever, scribed in equal times; or when, k being described time h, $k \div h$ is always the same. That is, $k \div h$ retain its value, however small h may be; or the $k \div h$ must also have that value. And we have seen it would be impossible to declare, experimentally, existence of uniform velocity, even if our senses imperfections, upon the experience of comparisons finite equal spaces, however small: nothing but of *the limit of* $k \div h$ being the same thing wherever point A might be placed, would give mathe evidence of the velocity being uniform.

In all cases, then, by the velocity of a point in at any particular period of its motion, is to be under the limit of the ratio which the increment of the length scribed bears to the increment of the time expended description of that increment of length. That is, length be measured in feet, and the time in seconds, be the fraction of a foot described in the fraction of a h, the limit towards which the fraction k divided fraction h continually tends while h is diminished limit, is the number of feet per second which, we may expresses the rate of motion at the period in question. The student of the differential calculus will now have difficulty in altering the preceding into the following if the length s be described in the time t, the velocity at the end of the time t is thus expressed:

$$v=\frac{ds}{dt}$$

If y be any function of x, and if x represent the ber of units of length described by a moving point time t, and y the same for another moving point, if $y = \phi x$, we have by the rules of the differential lus:

$$\frac{dy}{dt} = \frac{dy}{dx}\frac{dx}{dt}.$$

$dy : dt$ and $dx : dt$, represent $\dot{y}$ and $\dot{x}$, Newton's IONS of y and x; and $dy : dx$ is obviously the same as $\dot{y} : \dot{x}$. The term fluxion merely means velocity, after all, there can be formed no clearer notion of a ential coefficient than one which is formed from a deration closely resembling the fluxional one. If y function of x, $dy : dx$ is the rate at which y is in- sing, as compared with that at which x increases. s if $y = x^4$, $dy : dx = 4x^3$, which when $x = 10$ is . What does this mean? We say that nothing can er more clearly than the following:—If a number be gined to be gradually increased [VARIABLE], by the it becomes 10 its fourth power will be, at that instant, easing 4000 times as fast as itself.

ACCELERATION is the increase of velocity; and in the le cited uniform acceleration has been considered, its laws deduced, if not with the forms, yet on the ciples, of the differential calculus. Precisely the same culties come before us in the development of the measure cceleration as in that of velocity, and they are to be met e same manner. In fact, by the acceleration is meant rate of increase of the velocity, the velocity of the city. Suppose the velocity, first, to increase uni- ly: that is to say, let b feet be added to it in every nd, and in that proportion for all times elapsed; if a be the initial velocity, that at the end of the time $a + bt$, and we have

$$\frac{ds}{dt} = a + bt \qquad s = at + \tfrac{1}{2}bt^2$$

be measured from the point of starting. Here is at length due to the initial velocity a, and $\frac{1}{2}bt^2$ the effect he continual acceleration. Now suppose, returning to diagram, that the velocity at B is greater by l than at A, the fraction h of a second having elapsed ween the two positions: that is, suppose that at A the nt begins to move as if it meant (continuing our illustra-) to describe v feet in the next second; but that by the e of coming to B it begins (from B), as if it would ribe $v + l$ feet in the next second. If this increase of city were uniformly given, that is, if in the time $\frac{1}{2}h$ velocity had become $v + \frac{1}{2}l$, in $\frac{1}{3}h$, $v + \frac{1}{3}l$, and so on every fraction of h, we might then infer that the eleration at A, that is, the rate at which velocity is n increasing, measured by the quantity which would be ned in a second at the same rate, is $l \div h$: for as h is to second, so is l gained in the time h to what would be ned in a second at that rate. But if this supposition not true, that is, if the speed receive *unequal* additions equal times, we must then begin to reason as before, d to find what (pursuing the same illustration) we may ll the intention of the velocity. If l be added to the locity in the small time h, it will be added nearly uni- mly; if h be still smaller, still more nearly, and so on: such manner that while, practically speaking, $l \div h$ is sufficiently good representative of the current rate of celeration, when h is small, the (uniform) rate of ac- leration which best represents the state of things at A the limit which is deduced by making h diminish thout limit. And here again, copying our own pre- ding words, we do not undertake to say at what rate the locity is increasing when the moving point is at A, but hat fictitious *uniform* rate of increase best represents, at e instant, the *variable* rate of increase which would be ffected if the changes of velocity between A and B could e noted. And hence, if w be called the acceleration, the udent of the differential calculus will easily deduce,

$$w = \frac{dv}{dt} = \frac{d^2s}{dt^2} \text{ since } v = \frac{ds}{dt}$$

nd also $v\,dv = w\,ds$.

Thus if the motion of the point be such that in t seconds here are described $t^3 + t^4$ feet, we have as follows:—

$$s = t^3 + t^4,\ v = 3t^2 + 4t^3,\ w = 6t + 12t^2$$

At the end of 2 seconds, then, the state of things is this:—the point has advanced 8 + 16 or 24 feet, and if allowed to move on without further change of velocity, would describe 12 + 32 or 44 feet in the next second, and has the velocity 44 (feet) in one second: while at the same time there is an acceleration taking place which would, if allowed to remain uniform for one second, add 12 + 48 or 60 to the velocity, making it 44 + 60 or 104 at the end of the third second. But this rate of acceleration is itself increasing, since at the end of the third second the velocity is 27 + 324 or 351.

So far the subject, and all notions connected with it, fall within the province of pure mathematics: if there were no such thing as either matter or force, but only motion and a mind to conceive it, all that has been said might be intelligible. It is very much to be regretted that the connection between the mathematical doctrine of motion and the laws of matter is unduly made, and at too early a stage, by the application of the term *accelerating force*, instead of simple *acceleration*, to the result $dv : dt$. Acceleration would be what we have described it to be, if matter were not inert, if it moved by its own volition, or on any supposition whatever, provided only that it moved. Why then should a theory be made to supply the name of a result antecedent to that theory, and which would be perfectly true even if that theory were false? The consequence of this is, that when the laws of matter come to be applied to the mathematical expressions of motion, things are taken for granted which ought to be learnt.

The connexion between these two subjects is made in the manner described in the article FORCE, according to which it appears that if the weight of a particle be W, and if (this weight being taken away, as by laying the particle on a table without friction) a pressure be constantly exerted upon it such as would be produced by a weight P, in any direction in which it can move freely, the amount added to the velocity will be uniform, at the rate of 32·19 P ÷ W feet in every second. Hence the following equation:—

$$\frac{32{\cdot}19\,P}{W} = \frac{dv}{dt}, \text{ or } P = \frac{W}{32{\cdot}19}\frac{dv}{dt}.$$

For example, what pressure must act uniformly for one second on a particle of 7 ounces weight, to add 13 feet per second to its velocity, or that the rate of motion at the end of that second may be 13 feet per second greater than at the commencement. Here $dv : dt = 13$, $W = 7$, and the answer is

$$P = \frac{7 \times 13}{32{\cdot}19} = 2{\cdot}83 \text{ ounces.}$$

The numerical divisor 32·19, the uniform acceleration of bodies falling freely in vacuo at the earth's surface, is usually denoted by g, and the factor $W \div g$ usually stands for the MASS of the body, or the measure of its quantity of matter. Hence the following equation:—

$$P = M\frac{dv}{dt};$$

and this remains true, whatever unit of mass be employed, provided only that the pressure, which is called unity, shall be that which, exerted for one second upon the unit of mass, shall add a unit to the velocity. And now comes another consequence of the application of the term force to the simple consequence of force, acceleration. The word is wanted again to signify this pressure which produces acceleration, and for distinction the pressure is called *moving force*. [MOMENTUM; MOVING FORCE.] So, then, the name of the pressure which acts and produces continual accessions to the speed is moving force; while the name of the rate of acceleration is accelerating force. To mend this confused use of terms, some writers endeavour to create a notion of moving force independent of the pressure; but as they always end in saying that the moving force varies as the pressure, and never tell us more of its definition than that it is the product of the mass and acceleration, they might save themselves trouble, and their readers also, if they would simply establish the above equation, where P means the pressure which produces acceleration, and that pressure is the unit of its kind when it is of that magnitude which creates in the unit of mass a unit of velocity per second.

As we are now differing from men of deservedly good authority, both at home and abroad, and intending to make our assertion in a more positive manner than is usual with us, we may be excused for dwelling a little more upon the subject. If we consider the natural meaning of moving force and accelerating force, it is obviously as follows:—moving force is force which makes motion; accelerating force is force which makes acceleration, or increased motion. Were the distinction ever so necessary, these words would be very bad ones, and would always obstruct the learner. Nor does this origin of the word moving force, namely, that which produces MOMENTUM, give any help: for the synonyme for momentum, namely, *quantity of* motion, meaning really quantity of matter moved multiplied by the velocity, is a perversion of words of the same kind. To *momentum* we have no objection: it is a Latin word to which an English ear may easily be familiarised in any sense. If geometers had chosen to call an equilateral triangle a *momentum*, the etymological student might have been startled, but the shock would soon have been got over: but if they had called the same figure a *quantity of motion*, every beginner would have been puzzled, and the impression would have been lasting. But, returning to the two species of forces, so called, we find a double inconsistency: the idea of motion is introduced into the word which only means pressure (for *moving force* is but pressure), while the idea of pressure is introduced into a word which has only reference to motion (for *accelerating force* is but acceleration). There are two distinct and leading ideas in mechanics, pressure and motion: on keeping them perfectly distinct till the time comes for joining them experimentally it must depend whether a student sees mechanics to be a science or not. If any one should say that pressure producing motion ought to be distinguished from pressure which is in a state of equilibrium with other pressures, we could not of course raise any objection: let then *moving force* and *resting force* be used in these two senses, with a clearly expressed distinction. Here force would be synonymous with PRESSURE, in the derived or secondary sense of the article cited. But let acceleration be then acceleration, not accelerating *force*.

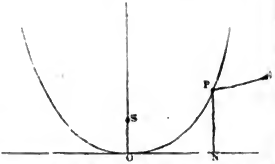
The COMPOSITION of velocities and accelerations is so easily proved, that we do not think it necessary to lengthen this article by dwelling upon it. Two of a sort, whether velocities or accelerations, acting upon one particle, at any one instant, are equivalent to a third represented in magnitude and direction by the diagonal of a parallelogram, the two sides of which represent in magnitude and direction the two components. And by the law of motion which is commonly called the second [MOTION, LAWS OF, p. 452], the several accelerations which act on any particle *in any given directions* may have their effects computed separately, without any error being introduced. If then, supposing a particle to move in a plane, the pressures P and Q be applied to it in the directions of the rectangular coordinates x and y, the mass of the particle being M, we have

$$M\frac{d^2x}{dt^2}=P, \quad M\frac{d^2y}{dt^2}=Q$$

equations which are only true on the supposition that there is this connection between the unit of mass and that of pressure, namely, that the latter acting on the former during one unit of time shall add to the line which represents its velocity one unit of length. These equations are enough to determine the equation of the curve in which the particle must move, P and Q being given functions of both x and y; and the time of motion through any arc of the curve s is then found from the following equation:—

$$\left(\frac{ds}{dt}\right)^2 = 2\int(Pdx + Qdy) \text{ or } dt = \int\frac{ds}{\sqrt{(2Pdx + 2Qdy)}}$$

It is not here our business to proceed further with the consequences of the definitions of velocity and acceleration: but we must explain a point which will arise in our subsequent article on Virtual Velocities. When we have the means of actually ascertaining the motion of a particle of given mass, that is to say, of finding at every instant its actual place, its velocities in the directions of its coordinates, and its accelerations in those directions, we are prepared to assign the pressures which must act upon it in those directions, at the instant we are speaking of, either in mathematical units of pressure, as before described, or, if the reader please, in pounds or ounces averdupois. To show this, let us propose an instance, as follows:—A particle whose weight (if weight were allowed to act) is



10 ounces, moves uniformly along the arc of a parab (whose focus is S, OS being half a foot) at the 2 feet per second: What pressures in the directions and NP (or of x and y) are necessary to keep up the tion; and in particular what are the pressures velocities at the point P at which NP = 3 feet? equation of the curve is $2y = x^2$, whence we get

$$\frac{dy}{dt} = x\frac{dx}{dt}$$

Or the velocity in the direction of y is to that direction of x always as x to 1.

But, s being the arc OP, we have

$$\frac{ds}{dt} = 2, \quad \frac{ds^2}{dt^2} = \frac{dx^2}{dt^2} + \frac{dy^2}{dt^2} = 4$$

$$\text{whence } \frac{dx^2}{dt^2} = \frac{4}{1+x^2} \quad \frac{dy^2}{dt^2} = \frac{4x^2}{1+x^2}.$$

At the point in question $y = 3$, $x^2 = 6$, from velocities in the directions of x and y are found $\pm\sqrt{(\frac{4}{7})}$ and $\pm\sqrt{\frac{24}{7}}$, or ·756 and 1·852. We take positive signs, since both motions obviously tend crease* their coordinates. Differentiate the tions again, and we have,—

$$2\frac{dx}{dt}\frac{d^2x}{dt^2} = -\frac{8x}{(1+x^2)^2}\frac{dx}{dt}, \quad 2\frac{dy}{dt}\frac{d^2y}{dt^2} = \frac{8x}{(1+x^2)^2}$$

$$\frac{d^2x}{dt^2} = -\frac{4x}{(1+x^2)^2} \qquad \frac{d^2y}{dt^2} = \frac{4}{(1+x^2)^2}$$

or the velocity in the direction of x is always while that in the direction of y is always And at the point in question we have $-4\sqrt{6} \div$ $4 \div 49$ for the accelerations, say − ·200 and which we mean that if the pressures then acting directions of x and y were allowed to continue one second, they would alter the velocities in the tions of x and y from ·756 and 1·852 to ·756 − 1·852 + ·082. The weight of the particle, if were allowed to act, being 10 ounces, the pressures would produce the preceding accelerations are, ounces—

$$-\frac{10}{32\cdot19}\frac{4x}{(1+x^2)^2} \text{ and } \frac{10}{32\cdot19}\frac{4}{(1+x^2)^2},$$

the pressure in the direction of x being in the from N towards O. At the point in question these sures are − ·062 and ·0253 ounces.

The pressures thus derived from the motion actually takes place, by means of the accelerations d^2x : and $d^2y : dt^2$, are usually called the *effective* forces; the name is very appropriate, because it is true these must be the forces which do really act. pressures produce different accelerations upon the mass; or to one acceleration there is but one pressure, the mass being given. But it may happen the forces actually *impressed*, or the pressures applied, at the point P, may be very different from which just produce the motion that is produced. for example that the mass P were attached to the by the rigid rod PQ without weight: and suppose forces to be applied at P and Q as, whatever may of Q, cause P to move uniformly along the parabola in the manner above described. We may assign an infinite ber of different motions to Q, and for each motion of Q we may assign an infinite number of pressures which being applied to P and Q, will give the two their ed motions. But in no one of these cases can the .l amounts of pressure really applied to P, in the ctions of x and y, be any other than those which calculated above: whatever may be the pressures ally applied at P, the thrust or pull, as the case be, of the rod PQ, will supply what is necessary to ce all the forces that act on P (those directly applied that arising from the said thrust or pull) together ivalent to the pressures above calculated. This is the dation of *D'Alembert's principle.* [Forces, im-ssed and effective; Virtual Velocities.]

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* We have not entered into the distinction of meaning between negative velocities and accelerations, since the question is a purely one, unnecessary to be treated here if the student really understand and impossible to be explained within our limits to one who does not.

† The weight has been throughout supposed to be neutralized, as it be if the parabola were in the plane of a table, on which the particle is

he connection between velocity and pressure is not obscured by phrases as cloudy as 'moving force,' but by the use of the unit of mass instead of the unit of ght. This measurement by masses instead of weights convenient and so desirable on rational grounds, that annot ultimately be dispensed with; but at the first set the student should be taught to reduce the new de of proceeding into terms of that with which he is n better acquainted. A beginner in the theory of gra-ation is not allowed to have the least idea of the amount he attractions of the several bodies upon each other in nds or tons, or any other unit which he can at once erstand. And we should not be surprised if many who easily compare the sun's attraction upon the earth the earth's attraction upon the moon, so as to find er of them when the other is given, would be awkward f not actually puzzled by, the question of comparing er of them with the weights in a grocer's shop. Un-btedly there would not be much of astronomical utility e question; but for clear conception of the meaning mode of derivation of mechanical results, nothing can f more importance than the actual comparison of all lts with those which are best known, because actually and perceived.

ELOCITIES, VIRTUAL. [Virtual Velocities.]

ELORE (*Velur*), a fortified town in Hindustan, is ated in a small district of the same name, in the pre-ency of Madras and province of the Central Carnatic, on south bank of the river Palaur: 12° 55′ N. lat., 79° 12′ long.

elore was formerly a place of importance, as it com-ded the main road from the coast of the Carnatic to province of Mysore; but since the conquest of Mysore as become of little consequence, except as a military on. The fortress is surrounded by a strong stone wall, bastions and round-towers at short distances, and by de and deep ditch, over which there is a causeway, ing the only entrance. In the ditch there are, or at t were, a number of large alligators.

1646 Velore fell into the hands of the Mohammedan s of Golconda and Bejapoor. In 1677 it was captured evajee. In the war of 1781 it was invested by Hyder with a large army, and reduced to extreme distress for t of provisions; but as the fate of the Carnatic was then sidered to depend upon it, it was not only relieved by Eyre Coote, but Hyder was compelled to retreat. er the conquest of Seringapatam in 1799, the whole of poo Saib's family, twelve sons and eight daughters, e removed to Velore, which was fitted up for their modious residence, with an allowance for their support re liberal than they had received from Tippoo himself. the 10th of July, 1806, an atrocious revolt and massacre k place in the town, in which some of the family of poo were active participators. The insurgents were dued and many of them slain by a party of the 19th goons under Colonel Gillespie. The instigators of the olt were then removed to Bengal.

elore is 20 miles W. from Arcot, and 88 miles W. by S. m Madras, travelling distances.

Hamilton's *East India Gazetteer*; Mill's *History of itish India*, by Wilson.)

VELUM, an architectural term, not in general use, but erving to be established on account of its convenience l expressiveness, since it distinctly describes at once at must else either be left doubtful or be particularly plained. Woods employs the term in speaking of the llery called the Braccio Nuovo in the museum of the tican, saying, 'The central division is covered by a *um*, that is, by a cupola, the diameter of which is equal the diagonal of the square, on which it rises, and of ich, consequently, the sides are cut away.' His expla-tion is however rather an awkward one, since it would be more correct to say that the dome, or concave circular ceiling, is cut away at its base by the sides of the square, or polygon—for it may be either, inscribed within its circumference. Such ceiling or vault therefore assumes somewhat the appearance of an awning or *velum* stretched immediately upon arches.

VELUTI'NA, Lamarck's name for a genus of his family *Macrostomata*, from the rest of which however Velutina remarkably differs.

Description.—Shell subglobose; spire short, composed of two rapidly enlarged ventricose whorls; aperture large, subovate; peritreme thin, entire, separated from the last whorl; columella twisted and thin; epidermis velvetty.

Mr. J. E. Gray places the *Velutinidæ*, with the single genus *Velutina*, between the *Truncatellidæ* and the *Paludinidæ*.

Example, *Velutina lævigata*.

Velutina lævigata.

VELVET, a variety of the silk manufacture, remarkable for the softness of its surface. The manufacture of velvet was unknown at least several centuries after the introduction of plain woven silks, and it is not mentioned in any documents earlier than the thirteenth century. For a long time the manufacture of this fabric was confined to Italy, where, particularly in Genoa, Florence, Milan, Lucca, and Venice, it was carried on to a great extent. It was subsequently introduced into France, and brought to great perfection. On the revocation of the Edict of Nantes, in 1685, this branch of weaving was begun in England by the refugees. The peculiar softness of velvet is owing to a loose 'pile' or surface of threads, occasioned by the insertion of short pieces of silk thread doubled under the shoot, weft, or cross threads. These stand upright so thickly as entirely to conceal the interlacing of the warp and shoot. The richness of the velvet depends upon the closeness of the pile-threads. The insertion of these short threads is effected in the following manner:—Instead of having only one row of warp-threads, which will be crossed alternately over and under by the shoot, there are *two* sets, one of which is to form the regular warp, while the other is to constitute the pile; and these two sets are so arranged in the loom as to be kept separate. The quantity of the pile-thread necessary is very much more than that of the warp-thread; and therefore must be supplied to the loom by a different agency.

If the pile-threads were worked in among the shoot in the same way as the warp-threads, the fabric would be simply a kind of double silk, but without any kind of pile; the pile-threads are therefore formed into a series of loops, standing up from the surface of the silk; and by subsequently cutting these loops with a sharp instrument, the pile is produced. The loops are formed in a very singular way. After the weaver has thrown the shuttle three times across, making the shoot interlace three times among the threads of the warp, he inserts a thin straight brass wire at right angles to the length of the piece, or parallel with the shoot. The wire is so placed as to occupy a position through the whole breadth of the fabric, above the warp-threads and below the pile-threads. The treadle is then put to work, the alternate threads of the warp raised, and the shuttle again thrown; by which a shoot-thread is thrown *over* the pile-threads, and also over one-half of the warp-threads; the wire becomes thus, as it were, woven into the substance of the fabric. Two more traverses of the shoot are then made, passing alternately under and over the warp-threads in the usual way, but not interfering with the pile-threads. Another wire is then laid in, below all the pile-threads and above all the warp-threads, and this is secured by subsequent shoot-threads, as in the first case.

By a most delicate and difficult operation, these wires are removed by the same operation which produces the raised pile. Each wire is nearly a semicylinder in form, and has along its upper surface a carefully constructed groove, and along this groove the weaver passes the sharp edge of a cutting instrument called a *trevat*, severing the pile-threads in his progress. It necessarily follows from this operation that two ends of each thread are thus loosened, and these ends, being afterwards brushed up and dressed, constitute a portion of the pile, sufficiently long to hide completely the woven fabric beneath. Two wires are employed, because if one only were used, the pile-threads would become disarranged when it was removed. When the liberated wire has been again inserted, and three shoots thrown to secure it, the second line of loops is cut and the second wire removed; and so on during the weaving of the whole length. Striped velvets are produced by some of the pile-threads being uncut. The slowness and delicacy of this branch of manufacture may be judged from the fact that forty or fifty insertions of the grooved wire are made in the space of one inch, the loops of the pile being cut an equal number of times. In addition to the other complications, the weaver has to use two shoot-threads, and consequently two shuttles; for the shoot thrown immediately after the insertion of the wire is stouter than the two following. Mr. Porter thus speaks of the unintermitting carefulness required in the succession of operations on the part of the weaver:—'The use of the trevat in cutting the pile calls for a certain amount of skilfulness or sleight-of-hand, only to be fully acquired through care and after long practice, while the minutest deviation from the proper line in performing this part of the process would infallibly injure, if even it did not destroy the goods; and the movements to be made throughout the entire operation are so numerous, and require such constant changing of the hand from one action to another, that the weaver is greatly and unavoidably retarded in his progress. It is considered to amount to a very good day's work when as much as one yard of plain velvet has been woven. For this the workman is usually paid five times the price charged for weaving gros-de-Naples.' [SILK.]

Cotton is now employed, as well as silk, in the manufacture of velvet. The different varieties of fustian are a kind of cotton-velvet. [WEAVING.]

(Porter's *History of the Silk Manufacture*; *Penny Magazine*, vol. xi., No. 670.)

VENA CONTRACTA. [HYDRODYNAMICS, vol. xii. pp. 390, 391.]

VENAFRO. [LAVORA, TERRA DI.]

VENAISSIN, LE COMTAT. [COMTAT D'AVIGNON (LE), and LE COMTAT VENAISSIN.]

VENANT (ST.). [PAS DE CALAIS.]

VENCE. [VAR.]

VENDEAN WAR. [VENDE'E.]

VENDE'E, a department in the western part of France, bounded on the north by the department of Loire Inférieure, on the north-east by that of Maine et Loire, on the east and south-east by that of Deux Sèvres, on the south by that of Charente Inférieure, and on the south-west and west by the Atlantic Ocean. Its form approximates to that of an oval, having its greatest length from north-west to south-east, from the coast near Beauvoir, opposite the island of Noirmoutier, to the border of the department of Deux Sèvres, on the road between Fontenay and Niort, 82 miles; and its greatest breadth, at right angles to the length, from the coast near Les Sables d'Olonne to the junction of the three departments of Vendée, Maine et Loire, and Deux Sèvres, near Mortagne, 56 miles. These are the dimensions of the mainland; but the department comprehends the islands of Boin, Noirmoutier, and Dieu. The whole is comprehended between 46° 18′ and 47° 4′ N. lat., and between 0° 35′ and 2° 30′ W. long. The area of the department is estimated at 2639 square miles, which is above the average area of the French departments, and just a little above the area of the English county of Lincolnshire, with which, from its maritime position, low, flat, and marshy character, and the agricultural pursuits of its inhabitants, it may be not unsuitably compared. The population in 1826 was 322,826; in 1831, 330,350; and in 1836, 341,362, showing an increase in the last five years of 11,012, or between 3·0 and 3·5 per cent., and giving 129 inhabitants to a square mile. In amount and density of population it is decidedly below the average of the French departments, and in both respects is about equal to Lincolnshire, taking the medium between the English enumerations of 1831 and 1841. Bourbon Vendée, the chief town, is 227 miles in a direct line south-west of Paris; or 253 by the road through Orléans, Blois, Tours, Saumur, and Chollet: in 46° 42′ N. lat., and 2° 27′ W. long.

The coast of this department is generally low. north-western coast forms, with the islands of Noirmoutier, the bay of Bourgneuf, so called from town of Bourgneuf, in the adjacent department of Inférieure. The south-western coast forms, with the of Ré (belonging to the department of Charente Inférieure, the gulf Pertuis Breton. The shore is low, and lined marshes or fens, which rest on the north-west on of sand, and on the south-west on a very thick stratum stiff clay. These marshes are unhealthy, and destitute good water; but industry has rendered them remarkable for their fertility, especially in the north-western they are intersected in every direction by ditches for the purpose of drainage. The island of Boin may be compared to our own Thanet, being insulated only by a small Le Dain, not navigable. It is united to the mainland a causeway across the Dain. The island appears to formed by alluvial deposits on a limestone rock; about 7 miles long from north-east to south-west, about 4 or 4½ miles across at the widest part. tier protects the bay of Bourgneuf to seaward: it is 12 miles long from north-north-west to south-south and in one part nearly 5 miles broad. It is separated the mainland at its south-eastern extremity by a channel, called 'Le Goulet de Fromentine,' or ' Fromentine,' not much more than half a mile across time, but at low-water scarcely a quarter of a mile. coast of the island is lined in some parts by sand low flat rocks, in others by sands and shoals extending out to sea: these shoals nearly fill the bay of There are some little coves in the island, accessible boats; and on the east side, in the bay of Bourgneuf small road or anchorage. The soil of the island fertile; and, by the use of wrack or sea-weed as the inhabitants are enabled to produce a succession crops without fallows: some of the most productive are considerably below the level of the sea, from they are protected by embankments. The produce of island includes grain, pulse, fruit, salt (made in the marshes), and good cheese. The oyster fishery is carried on; and the inhabitants, who amount to 8000, are excellent seamen. The island Dieu, or lies farther out from the mainland, from the nearest of which it is distant more than 10 miles: its chief St. Aubin, which is in a central position, is in lat., and about 2° 22′ W. long. The length of is about 6 miles from north-west to south-east; its about 2½ or 3 miles. Its western coast, towards the sea, is high and inaccessible; the eastern coast is flat, affording ready and safe access to small boats. whole island is little else than a vast granitic rock, with a vegetable soil three feet in thickness in the part, but in the higher ground so thin as to leave the almost bare. About half the land is cultivated, the a mere waste, affording scanty pasturage to a few head cattle. The inhabitants amount to about 2500, all gaged in fishing. There is a small port on the east of the island. On the coast of the mainland, opposite island Dieu, is the bay or road of St. Gilles; and south-west coast, in the Pertuis Breton, is the road of guillon, east of which is the point of Aiguillon, a sandy tongue of land, jutting out some distance into the

The department is crossed on the north-eastern the heights, which extend from the mountain-district central France north-westward to the mouth of the These heights cross just within the border of the ment, here formed by the little river Sèvre Nantaise valley of which they overlook. The hills are none of the lofty, having their greatest elevation under 500 feet: they overspread a considerable tract. These grounds consist for the most part of granitic or other mitive or lower secondary rocks: the flat country, extends southward and westward towards the coast occupied chiefly by the limestones, and other formations intervening between the cretaceous and new red stone groups. The department is not rich in minerals There are three coal-mines, of which only one was in 1834, when it gave employment to 11 workmen, produced 180 tons of coals, valued at 18s. 7d. per ton: produce in 1835 was 504 tons. There were no iron-works in the department in 1834: in 1835 there were some, we know not how many. There are a number of mineral springs, but none of any celebrity. The manufacture is actively carried on in the marshes which line the :.

ie greater part of the department is drained by several l rivers, which flow into the Atlantic; but the north- ind north-eastern parts belong to the basin of the Loire, are drained by its two tributaries, the Sèvre Nantaise, its affluent the Maine (formed by the juncture of the de Maine and Petite Maine) and the Boulogne, h flows into the lake of Grand Lieu, and then, under name of Acheneau, reaches the Loire. The rivers h flow directly into the Atlantic are the Sèvre Nior- , which just passes along or within the southern er of the department, and with its feeders the Autize the Vendée drains the south-eastern part; the Lay, ed by the junction of Le Grand Lay and Le Petit which with its affluents, the Yon, the Smagne, and Loing, drains the central and south-western parts; and Gui-Chatenay, the Ausance, the Jaunay, the Vic with feeder the Ligneron, the Canal du Perier, and the al du Etier, all small, which drain the western and h-western sides of the department. The Dain is a ow channel, separating the isle of Boin from the main- . Of these the Sèvre Niortaise is navigable in all the which is in this department or on the boundary; the ize is navigable for about six miles above its junction the Sèvre Niortaise, and the Vendée from Fontenay it sixteen miles above its junction with the same river; Lay has by labour been made navigable for about nty miles above its outfall; and the Vic is navigable for it five miles.

he only navigable canal is that of Luçon, which has a se due south, nine miles from the town of Luçon, into road of Aiguillon.

here were, 1st January, 1837, five 'routes royales,' or ernment roads, in the department, having an aggre- : length of 206 miles, namely, 190 miles in good iir and 16 miles out of repair. The roads are all of the d class. That from Paris by Tours and Saumur to irbon Vendée enters the department between Chollet l Mortagne, having been joined, before reaching Chollet, a road from Angers. It runs south-west from Mor- ne to Bourbon Vendée, and from thence, still in the e direction, to Les Sables d'Olonne. A road from ites to Les Sables enters the department between Legé Palluau, and runs south into the road from Bourbon dée. A road from Nantes to La Rochelle runs through centre of the department, from north to south, by itaigu, St. Fulgent, Chantonnay, and Ste. Hermine; a road from Niort to Les Sables crosses the southern of the department, from east to west, by Fontenay, on, and Talmont. The departmental roads have an regate length of 353 miles, namely, 155 in repair, 20 of repair, and 178 unfinished. The 'chemins vici- x,' which may be compared with our parish-roads and s, have an aggregate length of about 4000 miles.

he climate varies with the elevation of the soil. The rict of 'Le Bocage' (*i. e.* 'the woodland') in the north north-east side of the department, is the most elevated the healthiest. This district, which extends into the cent departments, derives its name from the abundance wood found in it, rather however in the form of copse thicket, than of forest, though intermingled with the lerwood are forest-trees, as oak, ash, chestnut, and elm. : soil of this part is chiefly a stiff loam, sometimes dy, and at other times clayey. The valleys which in- sect this hilly country are watered by numerous brooks, l afford good meadow-land; the hills are cultivated, :ept on the north side of the higher hills, where little ws except heath and furze. The extent of Le Bocage y be estimated at above 1000 square miles, or two-fifths the whole department. The temperature is colder than the rest of the department; but the air is purer: the nmer is usually very dry, the winter wet. The inhabit- ts are the most robust in the department, and are re- rkable for the simplicity of their manners, and their achment to old opinions and habits.

The district, which extends between the higher ground Le Bocage and the southern boundary of the depart- nt is called 'La Plaine' ('the plain'), and has an extent nearly 300 square miles: it is the most fertile district in department, and has a clayey soil resting upon limestone.

The rest of the department belongs to the district of e Marais' ('the marsh'), the most extensive district, but the most unhealthy, the air being loaded with fogs rising from the ditches and drains. The changes of temperature on the coast are great and sudden.

The area of the department may be estimated in round numbers at 1,680,000 acres, of which above 1,000,000 acres, or three-fifths, are under the plough; but agriculture is in a very backward state. Wheat, barley, oats, rye, millet, and buckwheat are grown: hemp and flax are grown in La Plaine and Le Marais, especially in the latter. The grass-lands are estimated at about 270,000 acres, an unusually large proportion for France, and the heaths and open pastures amount to above 160,000 acres; they are chiefly in Le Bocage and Le Marais. The breed of horses is vigorous, but neither large nor well made; a great number of mules and capital asses are bred. The cattle are hardy, but not handsome; and the improvement of the breed of sheep is neglected. The vineyards occupy above 40,000 acres, chiefly in Le Bocage and La Plaine. The wines are of ordinary quality. The woodlands occupy from 70,000 to 80,000 acres, chiefly in Le Bocage; and the orchards amount to 20,000 acres: the apple, the cherry, and the chestnut are the principal fruits.

The department is divided into three arrondissements, as follows:—

Arrondissement.	Situation.	Area in Square Miles.	Cantons.	Communes.	Population. 1831.	Population. 1836.
Bourbon-Vendée .	N.	995	8	104	115,988	120,777
Fontenay . . .	E.	837	9	111	119,664	122,077
Les Sables d'Olonne	W.	807	11	79	94,698	98,508
		2639	28	294	330,350	341,362

A later return increases the number of cantons, or districts, each under a justice of the peace, to 30.

In the arrondissement of Bourbon-Vendée are—Bourbon Vendée, population in 1831, 3494 for the town, or 3904 for the whole commune; in 1836, 5257 for the commune [BOURBON-VENDÉE], on the Yon; La Chaize, a few miles E. of Bourbon Vendée; Aizenay, population 3303, on the road from Nantes to Les Sables d'Olonne; Montaigu and St. Fulgent, on the road from Nantes to La Rochelle; Mortagne, Les Herbiers, and Les Essarts, on the road from Paris to Bourbon-Vendée and Les Sables; St. Laurent and Tiffauges on the Sèvre Nantaise; and La Fougerai, on the Lay. Montaigu suffered considerably in the religious wars of the sixteenth century, and again in the Vendean war which followed the French revolution. Mortagne was also the scene of conflict in the Vendean war. The townsmen manufacture paper, and trade in linens, leather, horses, and sheep. Les Herbiers has a paper-mill, and a monthly cattle-fair: the neighbourhood yields tolerable wine.

In the arrondissement of Fontenay are—Fontenay, population in 1831, 6388 for the town, or 7504 for the whole commune; in 1836, 7650 for the commune [FONTENAY], on the Vendée; Maillezay, on the Autize; Luçon, population 3601 for the town, or 3786 for the whole commune, on the road between Fontenay and Les Sables d Olonne; Chantonnay and Sainte Hermine, on the road from Nantes to La Rochelle; Puybéliard, near Chantonnay; Mareuil, on the Lay; Vouvant, on the Mere, a feeder of the Vendee; La Châtaigneraye, on the Loing, a feeder of the Grand Lay; Pouzauge-la-Ville, near the Grand Lay; La Flocelière, near the head of the Petit Lay; Mouilleron, between La Châtaigneraye and Chantonnay; La Caillière, between La Châtaigneraye and Sainte Hermine; and Creil de Bournezeau, between Sainte Hermine and Bourbon-Vendée. Maillezay is in an unhealthy situation: it had in the middle ages a castle, the residence of the counts of Poitou, and a Benedictine abbey, founded by the Count Guillaume, or William IV. Some linens are manufactured. Luçon is an episcopal city, in an unhealthy situation in the marsh district, at the head of the canal of Luçon, by which vessels of 80 or 100 tons get up to the town. It has narrow, ill-paved streets; but the houses are large and commodious. The cathedral is a striking building of Gothic architecture. Linens are manufactured; corn, pulse, timber, staves, hoops, and coarse earthenware are exported; and wines are imported. Luçon suffered in the religious wars of the sixteenth century. Some weaving is carried on at Sainte Hermine; and there are several yearly fairs for cattle. Mareuil carries on some trade with Nantes by means of the Lay, which is navigable. Linens are manufactured at Vouvant; linens, woollen stuffs, and paper at La Châtaigneraye; and checked linsey-woolseys at Pouzauge-la-Ville.

In the arrondissement of Les Sables d'Olonne are—Les Sables d'Olonne; population in 1831, 4809 for the town, or 4906 for the whole commune; in 1836, 4778 for the commune; St. Gilles-sur-Vic and Beauvoir, all on or near the coast; Talmont, between Les Sables and Fontenay; Les Moutiers, a few miles east of Talmont; Noirmoutier, population 2573 for the town, or 7011 for the whole commune (including, we believe, the island), in the island of Noirmoutier; Challans, population 3288, and La Garnache, on the road between Nantes and St. Gilles-sur-Vic; and Palluau, on the road from Nantes to Les Sables d'Olonne. Les Sables d'Olonne, or simply Les Sables, is on a small inlet of the Atlantic, open to the south, which forms its port, and is capable of receiving vessels of 150 or 200 tons; the town itself is on one side of this islet, the suburb of La Chaume on the other. The town is protected in one part by the salt-marshes, in another by a feeble wall, and towards the port and the sea by a fort and batteries. The principal streets are parallel to the shore, and are well paved, clean, and lined with tolerably good, but irregularly built houses. There are two churches, a nunnery, a free-school of navigation, two almshouses, or hospitals, and a prison. The townsmen are engaged in ship-building, rope-making, and in the fishery, particularly of the pilchard. Corn, salt, and wine are exported. Les Sables was taken by the Huguenots in the religious wars of the sixteenth century; it was attacked by a combined English and Dutch fleet in 1696, when the fortifications were partly ruined; and twice attacked, but in vain, by the insurgents in the Vendean war. St. Gilles has a considerable export trade in corn and salt, and an active pilchard fishery. Talmont is small and ill built, on a rising ground, in the midst of the salt-marshes. Noirmoutier is well built and well paved: the road affords good anchorage for vessels of 200 tons, and there is a tide harbour with twelve feet of water when the tide is up.

The population, when not otherwise described, is that of the commune, and from the census of 1831.

The department constitutes the diocese of Luçon, the bishop of which is a suffragan of the archbishop of Bordeaux: it is included in the jurisdiction of the Cour Royale of Poitiers, and the superintendence of the Académie Universitaire of the same city. It is comprehended in the twelfth military division, the head-quarters of which are at Nantes; and sends five members to the chamber of deputies. In respect of education this department is considerably below the average of the departments; of every 100 young men enrolled in the military census of 1828-9, 28 could read and write, the average being between 39 and 40.

In the most antient historic period this part of France was part of the country of the Pictones (Πίκτονες, Strabo and Ptolemy) or Pictavi: the latter form does not appear to have come into use until near the downfall of the Western empire. The Agesinates, or perhaps Cambolectri Agesinates, are mentioned by Pliny as conterminous with the Pictones; and D'Anville, led by the name Aizenay, fixes their seat on the coast of the department near that town. The department came from the Romans into the hands of the Visigoths, then of the Franks; and in the middle ages was included in the province of Poitou, of which it shared the changes. [POITOU.]

The department of Vendée has been chiefly known in modern history for the civil war which broke out in it in the course of the French revolution. The district of Le Bocage, which extends into the four departments of Loire Inférieure, Deux Sèvres, Maine et Loire, and Vendée, was at the outbreak of the revolution a secluded district, the property of a number of comparatively small landholders, living on their estates with great simplicity, and mingling freely with their tenantry and others around them. 'Crimes,' says the marchioness of Larochejaquelein, 'were never heard of, and lawsuits were rare. The causes which had elsewhere exasperated the middle and humbler classes, and prepared the way for the Revolution, had little operation here. The religious feelings of the people also had remained undiminished, and indisposed them to join in the great movement that agitated France, or rather disposed them to resist it. The inhabitants of the towns, all of which were, and still are, small, and the people of the district of La Plaine, were favourers of the Revolution, but were not participators in the cruelties which stained it. The expulsion of the parish priests, men born and bred in the districts, and characterized by patriarchal simplicity, because they refused the constitutional exasperated the discontent of the peasantry with the order of things, and subsequent severities against refractory priests increased the exasperation.

Some partial disturbances were suppressed, but attempt to enforce in the district a decree of the vention for the levy of 300,000 men for the army, March, 1793, occasioned a general rising both in Bocage and in Le Marais. Cathélineau, a carrier hawker of woollens, of the village of Le Pin-en-Mauge or en Mango, near Beaupréau, in the department Maine et Loire, was the leader of the insurgents in first efforts, which were successful. Other leaders appeared, as D'Elbée, Bonchamp, Charette, Stofflet rigny, Talmont, Lescure, and Henri Larochejaquelein the war became general through the two districts hedges and thickets of Le Bocage assisted the operations of the peasantry, and the gallantry of their leaders mated their courage. Bressuire, Thouars, Parthenay, Châtaigneraye, and Fontenay were taken (May, last after a victory over a republican army of 10,000 and a numerous artillery, which with a considerable of money was taken by the insurgents. The republicans now assembled 40,000 men, half of them troops of line, to repress the rising; but the insurgents towards the Loire, took Saumur, with 80 cannon number of prisoners (10th June), and gained a passage over the river. Angers was evacuated by the Republicans and Nantes was attacked by the insurgents but without success. This defeat disorganized the deans: they had in the attack lost Cathélineau, who the capture of Saumur had been appointed commander-in-chief), and were obliged to abandon all they gained on the right bank of the Loire. Westermann, republican general, now advanced from the neighbour-hood of Niort with from 5000 to 10,000 men to them, but he was surprised (July, 1793), and totally feated at Châtillon. Another army, which advanced Saumur and Les Ponts de Cé near Angers, after one battle, was defeated at Vihiers (18th July), and pelled to return to Saumur, and the insurgents remained masters of the whole of the districts of Le Bocage and Marais except Les Sables d'Olonne, Luçon, and perhaps or two other places. Luçon was attacked (14th an army of 40,000 men; the republicans had 6000, but their position was good, and their light enabled them to inflict on the insurgents the defeat they had yet experienced.

The republican garrison of Mayence, which was by the terms on which that town had capitulated from against the allies for a year, was sent into La Vendée, a simultaneous advance of the republican armies Nantes, Saumur, Les Sables, and Niort was agreed they were to unite in the centre of the insurgent and crush all opposition. The insurgents anticipated movements by attacking the republicans at Chantonnay and Les Naudières (5th September): they were victorious in the first of these attacks, but suffered a repulse second. The war was acquiring a character of exas-tion on both sides; and the advancing columns of the publicans committed dreadful ravages. The insurgents no way dismayed, attacked and defeated at Coron September) one part of the column from Saumur, the following day the other part at Erigné and Les de Cé, where they once more gained a passage across Loire. On the 19th and 20th they repelled the from Nantes, with which the garrison from Mayence united, and defeated that from Les Sables at St. Fulgent but the troops from Niort under Westermann did not perience any check, and the other columns rallied and advanced. The republicans had superseded General claux, a man of courage and skill, who had formerly defended Nantes against Cathélineau, and had app Lechelle, an officer destitute alike of courage and to succeed him; but the actual direction of operations left to Kleber, an officer of great capacity, and the republicans, though stoutly resisted, advanced into the centre of the revolted districts. Lescure, Bonchamp, D'Elbée, who was nominal commander-in-chief, were tally wounded, the last two (October 17th) in a great feat of the insurgents near Chollet. Lescure lingered some time before his death.

Vendean fugitives, to the number of 80,000 men, a, and children, now crowded to the banks of the in order to cross to the right bank: they had 5000 ican prisoners whom it was proposed to put to death, ie intervention of their leaders prevailed on them to give them their liberty; and the Vendeans then ed their own passage (October 18) across the river it molestation, much against the wish of their sur- chiefs. Charette had some time before separated he rest, and with his division of the insurgent force cupied the island of Noirmoutier.

seat of insurrection was now transferred into Anjou laine. Laval was occupied by the insurgents, and of the Breton peasantry joined them. Henri de hejaquelein was chosen commander-in-chief. Their was estimated at from 30,000 to 40,000 men, who accompanied by a crowd of women, children, and persons. The republicans, who had been uncertain the movements of the insurgents, and had too readily osed that the insurrection had been put down by the pation of the country in which it arose, now marched rsuit. They were however beaten by the insurgents of October, 1793) at Laval, and the victory enabled Vendeans to continue their march by Mayenne, ères, Dol, and Avranches to Granville, a seaport in andie, which they attacked (14th and 15th November), ithout success: this failure determined them to return rds the Loire. At Dol they were attacked (Novem- 21st) by Westermann, who was defeated; and by Mar-, who was also obliged to retreat. They repelled a nd attack (November 23rd), and marched by Fougères Laval to Angers, which they tried to take, but without ess. They then marched by La Flèche to Le Mans, hich, after a slight skirmish, they took possession. Here were attacked (12th December) by Westermann, who repelled; but a fresh attack the same day by Wester- n, Marceau, and Kleber was more successful, and the appy Vendeans, worn down by fatigue, suffering, and ation, were defeated with fearful loss. More than 00 were killed; some of them fell in the battle, but e were crushed in the streets or were massacred after defeat. The greater part of the remainder retreated to al, and from thence to Ancenis, hoping to pass the e, but there were no means of transport. Laroche- elein and Stofflet, and some others, crossed in two l boats in order to seize and bring over some boats h were on the opposite bank: but after landing they attacked by a detachment of republicans and com- d to flee; and the Vendeans, now reduced to 10,000, eparated from their general, retreated to Savenay in ry disorganized condition. At Savenay the repub- s came up with them, and in the battle which ensued y the whole were killed or made prisoners. The few escaped were concealed by the Breton peasantry. chejaquelein was shot in a skirmish (4th March, 1794) after his escape across the Loire; but Stofflet and gny renewed the war in Le Bocage, and Charette, who separated from the main army before the passage of Loire, maintained a partisan warfare in Le Marais, e some of the peasantry of Bretagne, under the name houans, under the direction of M. de Puisaye, carried similar warfare in their own province. Those who surrendered on the promise of an amnesty were put to th by Carrier, a member of the Convention, who was t to Nantes to punish both the royalists and the ondins, who had also attempted a revolt. His sickening cities, his guillotining, shooting, and drowning of men, en, and children, to the number of 5000 at least (some ounts say 15,000), are among the most dreadful parts of revolutionary horrors.

hough on the downfall of Robespierre a milder system s pursued towards the Vendeans, the war was not sed. The jealousies of the royalists were however fatal them. Marigny, who had managed in a wondrous nner to escape across the Loire, was shot by order of fflet. The good generalship and moderation of Canclaux d Hoche, who commanded in the insurgent provinces, ught about a pacification which Charette and the other ndeans agreed to (17th February, 1795), with the excep- n of Stofflet; but he also two or three months afterwards ned a peace on the same conditions. The Chouans of tagne submitted just before Stofflet, and peace ap- ared to be restored in the west of France. It was however insincere; the royalists were secretly organized in Bretagne; some partial but unsuccessful outbreaks took place, and an expedition composed of 3000 French emigrants was prepared in England. This expedition landed in Quiberon Bay, in Bretagne (27th June, 1795), and their numbers were so far augmented by Chouans who joined them as to amount to 10,000 men or more: but the jealousies of their own officers and consequent mismanagement, and the energy and talent of Hoche, ruined the attempt, and nearly the whole of the royalist force perished in battle or in flight, or were shot after their capture. The troubles however did not cease. Charette resumed his arms and collected 9000 or 10,000 men in Le Marais of La Vendée; and a small English force, naval and military, accompanied by the Count of Artois (afterwards Charles X.), appeared off the coast and occupied the Ile d'Yeu. But Charette's force was dispersed; the English and the Count d'Artois withdrew from the coast; and though Stofflet and some other chiefs joined the rising, it was put down by the admirable management and humanity of Hoche. Stofflet by treachery and Charette by force, after defending himself like a lion, were both taken and shot; the former at Angers, 26th February, the latter at Nantes, 29th March, 1796. The insurgent districts were disarmed, and quiet was at length restored.

The insurrection of the West forms a remarkable episode in the history of the French revolutionary struggle. The simple honesty of the Vendean peasants, the generous devotedness of their early leaders, the striking alternation of defeat and victory, invest the movement with peculiar and romantic interest. But with the expedition across the Loire, and the calamities attending it, that interest in a great degree ceases. The war assumed a more savage character, the most high-minded and devoted loyalists, Cathélineau, Bonchamp, D'Elbée, Lescure, and Larochejaquelein had perished; and all the energy and perseverance of Charette, to whose talents Napoleon himself bore testimony, fail, in the absence of higher moral qualities, to excite interest.

During the consulate there were some troubles, but of little moment, and during the second reign of Napoleon, 'the hundred days' of 1815, the Vendeans again took up arms in support of the Bourbons. The insurrection was however unimportant, and in an encounter in Le Marais with the imperial troops (4th June) a few days before the battle of Waterloo, Louis Larochejaquelein, brother of Henri, who headed the insurgents, was killed, and the insurrection put down. An insurrection in favour of the exiled Bourbons took place in 1832, in Le Bocage and some other parts of the West; but it was easily put down, though the country was for some time infested by predatory bands. At length the Duchess of Berri, who was lurking at Nantes, was discovered and taken, and the troubles ceased. The 'Mémoires' of the Marchioness of Larochejaquelein contain an interesting account of the first Vendean insurrection of 1793.

(Malte-Brun, *Géographie;* D'Anville, *Notice de l'Ancienne Gaule; Dictionnaire Géographique Universel;* Thiers, *Histoire de la Révolution Française;* Marchioness of Larochejaquelein, *Mémoires; Biographie Universelle; Annual Register;* Le Sur, *Annuaire.*)

VENDÔME. [LOIR ET CHER.]

VENDÔME, DUCS DE. The county of Vendôme was erected into a dukedom by Francis I. in favour of Charles de Bourbon, grandfather of Henri IV. In the person of the latter the dukedom of Vendôme, along with the other titles and territories of that branch of the Bourbon family, was united to the crown. The history of the first three dukes of Vendôme is part of the history of the families of Bourbon and Navarre. The dukedom of Navarre was alienated from the crown by Henri IV. in favour of his illegitimate sons by Gabrielle d'Estrées, Cesar and Alexander. This second family of Vendôme became extinct in 1712, and the peerage again lapsed to the crown.

The dukes of Vendôme of the second family are:—CESAR, eldest son of Gabrielle d'Estrées, by Henri IV.; born in 1594, legitimated in 1595, created duke of Vendôme in 1598. In 1610 Henri gave the duke of Vendôme precedence over all the peers of France, except the princes of the blood. After the death of Henri the duke placed himself at the head of the discontented nobles, who maintained that the marriage of Louis XIII. with a Spanish infanta was incompatible with the good of the state. He was arrested in 1614, by orders of the queen-mother, but escaped to his government of Bretagne, and took up arms against the court. He was obliged, by the desertion of his retainers, to submit. In 1622 he sided with the court against the Huguenots, from whom he took Clerac. He defended Montauban and assisted at the taking of Montpellier. In 1626 he was involved by his brother in a conspiracy against Richelieu: for this he was imprisoned, and only purchased his liberty at the end of four years by revealing everything and giving up his government of Bretagne. In 1631 he commanded at the siege of Lillo the volunteers in the Dutch service. In 1641 he was accused of having conspired to poison Richelieu, and fled to England, from which he did not return till after the death of the cardinal. In 1650 he was appointed governor of Burgundy. He contributed to the pacification of Guienne, and took Bordeaux from the malcontents in 1653; he dispersed and put to flight the Spanish fleet before Barcelona in 1655; he was soon after forced by his growing infirmities to retire from active service; but survived till October, 1665, when he died at Paris, in his seventy-first year. Some letters of Cesar duke of Vendôme, relating to the disturbances in Brittany, were published in 1614. By his marriage with Françoise de Lorraine (to whom he was affianced in 1598), he had three children:—1, Louis, who succeeded him; 2, François, created duke of Beaufort; and Elizabeth, married to Charles Amadeus of Savoy, duke of Nemours.

Alexander, brother of Cesar, was born in 1598; and legitimated in 1599, on which occasion he received, like his brother, the rank and title of duke of Vendôme. He was admitted a knight of Malta; and in 1612, fearing the enmity of the Maréchal d'Ancre, he took refuge in the island. In 1618 he was created grand-prior of the order in France. In the quarrel between Louis XIII. and his mother, the grand-prior embraced the party of the queen; but in 1622 he served the king against the Huguenots. He was arrested along with his brother, for conspiring against Richelieu, on the 13th of June, 1626; and died in prison on the 8th of February, 1629, not without suspicion of poison.

Louis, son of Cesar, was called duke of Mercœur during the lifetime of his father. He was born in 1612; made his first essay of arms in the campaign in Picardy, in which Louis XIII. commanded in person; served under his father at the siege of Lillo; distinguished himself at the sieges of Hesdin and Arras, and was wounded in the attack upon the French lines on the 2nd of August, 1640. He returned to France after the death of Richelieu; raised in 1649 the cavalry regiment of Mercœur; was appointed viceroy and commander-in-chief of the French troops in Catalonia; but not being properly supported by the minister, resigned in disgust. He made his peace with the court in 1651, when he married Laura Mancini, the elder of Mazarin's nieces. On his restoration to favour, he was appointed governor of Provence; in 1656 he was appointed, in conjunction with the duke of Modena, to command the army of Lombardy. His wife dying in the course of that year, he took priest's orders, and in 1667 was created a cardinal. Clement IX. nominated him legate *à Latere* in France. Cardinal Louis, duke of Vendôme, died at Aix-en-Provence in 1669. By his wife Laura Mancini he had two children:—1, Louis Joseph, who succeeded him; 2, Philippe, also called duke of Vendôme, grand-prior of the order of Malta in France.

Louis Joseph, born in 1654, was known previous to his father's death by the title of duke of Penthièvre. His education was neglected. He made his first campaign in Holland in the suite of Louis XIV. in 1672. He served in the last campaigns of Turenne, and was wounded in the combat of Altenheim during the retreat of the French army, which followed the death of that commander. He was created brigadier in 1677, and served in that capacity in Flanders under the Maréchal de Crequi. After the peace of Nimuegen the duke of Vendôme retired to his castle of Anet, and gave himself up entirely to pleasure. In 1681 he was nominated to the government of Provence, and refused to accept the money which the states were in the habit of presenting to every new governor. He was created lieutenant-general in 1688, and distinguished himself in the four succeeding campaigns, in particular at the sieges of Mons and Namur, and the combats of Leuse and Steinkerque. In 1693 he was sent to Italy, where Catinat commanded in chief. In 1695 he was appointed to Noailles in the command of the army of Catalonia. raised the siege of Palamos; invested Barcelona; by a prompt and brilliant attack the army under which was marching to release the city; and received capitulation on the 10th of August, 1695. These paved the way to the peace of Ryswick, after which dôme hastened back to Anet and its licentious and very refined pleasures. He was roused from his by the Spanish War of Succession. He was sent to repair the mistakes of Villeroi. In Italy he was joined Philip V. with a strong force from Naples. The troops far outnumbered the Imperialists; but the force was commanded by Prince Eugene. opened the campaign with spirit: he discomfited rear-guard of the Austrian army at Ustiano, and Vittoria, and raised the blockade of Mantua. habitual indolence soon resumed its empire, and his was surprised at Luzara on the 15th of August, 1702, of encamping, by the forces of Prince Eugene. presence of mind and the impetuous courage of his far redeemed his fault, that the victory remained Philip V. returned to Spain after this action, and with the united army penetrated into Tyrol, where feated Stahremberg on several occasions. From was recalled to Piedmont by the defection of the Savoy. He obtained several advantages over that but on the 16th of August, 1706, he again found and again by surprise—in the presence of Prince on the banks of the Adda near Cassano. Here, zara, Vendôme's presence of mind and the bravery army retrieved his negligence. In 1708, Vendôme sent to supersede Villeroi in Holland, who had been successful in that country as in Italy.

The reputation of Vendôme was obscured by the trous defeat of Oudenarde. In his defence it may that he had been recently placed at the head of the broken up and dispirited by the defeat of Ramilies; the country was new to him; and that his opponents Marlborough and Eugene. But after every allowance been made for these disadvantages, it seems generally admitted that the want of a proper between the duke of Burgundy and Vendôme cause of the loss of the battle of Oudenarde, fault was Vendôme's. His previous reputation, partisan spirit in which the question was France, enabled Vendôme to escape with less could have been anticipated. In 1710 Philip V., from his capital, and mindful of the battle of plored the assistance of his old general. Louis XIV. no time in despatching the duke to Spain. The and disbanded soldiers of Spain rallied round him parts of the kingdom; the imperial army was obliged evacuate Madrid; and on the 3rd of December, Vendôme restored Philip in triumph to his capital. king and his general quitted Madrid again in three overtook the rear-guard of the enemy, and obliged hope, with four thousand soldiers, to surrender at This advantage was followed by the well-disputed of Villa-Viciosa, in which Stahremberg was, after an nate contest, entirely defeated. On their return to Philip raised Vendôme to an equality with the princes the blood, and would have heaped wealth as well as upon him, had not Vendôme steadily refused to accept Some corps of insurgents who still held out for having occasioned disquiet in Catalonia in the early of 1712, Vendôme repaired to that province to tread these last sparks of internal war. While thus engaged, died suddenly at Tignaroz, on the 11th of June. possessed no small share of the genius, bravery, and humour of his grandfather; but these virtues were by more than that prince's voluptuousness, and a indolence which was no part of the character of Henri He married, in 1710, Marie-Anne of Bourbon Condé, survived him six years. There was no issue by this riage. The younger brother of Louis-Joseph having entered the order of Malta, the duke's estates at his reverted to the crown.

Philippe, younger brother of the preceding, the last of his family who bore the title of duke of Vendôme, born on the 23rd of August, 1655. He was received, while yet a child, into the order of Malta, in which he eventually rose to the rank of grand-prior, and made his aign under his uncle, the duke of Beaufort, in the of the Venetian army, in Candia, in 1669. He npanied his brother in all his campaigns, and was d upon as a distinguished soldier till the battle of ano, in 1706. His inactivity was the cause of the h troops being obliged to give way before the Aus- For this misconduct he was deprived of all his fices, and retired to Rome, where he subsisted on a on allowed him by Louis XIV. After an exile of five , he was allowed to return to France, and reinstated s benefices. He took up his abode in the Temple, bandoned himself to pleasure. In 1715 he went to a to take the command of the troops assembled to an attack apprehended from the Turks. The attack ot made, and the grand-prior returned to the Temple, e he died, on the 24th January, 1727. His mind was cultivated than that of his brother: he had a taste terature and the arts, and patronised their professors. her respects there was a great resemblance between haracters of the brothers: both were brave and both dissipated. The grand-prior was distinguished for centiousness in the licentious times of the regency.

ENDOR AND PURCHASER. The law of Vendors Purchasers of real estates in England is a subject of extent, which may be said to comprise nearly the e practical application of the law of real property. The t of this article is to state shortly the most important iples and rules of law upon the subject.

ntracts for the sale and purchase of land or other real e may be entered into either privately between the es, or upon a sale by auction. At common law, agree- s for the purchase of real estates might be made by , but by the Statute of Frauds (29 Car. II., c. 3, ss. 1, and 4), 'All leases, estates, interests of freeholds, or s of years, or any uncertain interest of, in, or out of any uages, manors, lands, tenements, or hereditaments, and created by livery and seisin only, or by parol only, not put in writing by the parties so making or creating same, or their agents thereunto lawfully authorised by ing, shall have the effect of leases or estates at will, consideration for making any such parol leases or tes notwithstanding.' But leases not exceeding three whereupon the rent reserved should amount to two- s of the full improved value, were excepted. The equires the assignment, grant, and surrender of exist- nterests to be in writing, and enacts that 'no action be brought whereby to charge any person upon any ment made upon any contract or sale of lands, nents or hereditaments, or any interest in or con- ng them, unless the agreement upon which such n shall be brought, or some memorandum or note of, shall be in writing, and signed by the party to be ged therewith, or some other person thereunto by him ully authorised.' The note or memorandum of agree- t required by the statute need not be a formal ment, and any writing, such as a letter, or receipt for hase money, may constitute an agreement within the te, provided it contain the terms of the agreement in itself, or by reference to another writing; and e document be written by the party, the occurrence is name anywhere in the document is a sufficient ing.

pon sales of estates by public auction, the highest er, upon being declared the purchaser, is considered ave entered into a contract for purchase according to particulars and subject to the conditions of sale; and the ioneer, who is for this purpose considered as the agent oth vendor and purchaser, is thereupon authorised to an agreement of purchase. The writing down the haser's name upon any memorandum of sale at the of the bidding is a sufficient signing. Sales by auc- of lands are within the above-mentioned enactments he statute of frauds; but sales before a master under a ee of a court of equity will be carried into execution ough the purchaser did not subscribe any agreement, the judgment of the court in confirming the pur- e takes it out of the statute. An auction duty of in the pound is payable upon all sales by auction ny interest in freehold, copyhold, or leasehold lands, ments, houses, or hereditaments (27 Geo. III., c. 36; Geo. III., c. 14; and 45 Geo. III., c. 30). It was a of the civil law, that if a vendor employed a puffer or son to make fictitious biddings in order to raise the price, it was to be considered as a fraud, and he should be compelled to sell the estate to the highest *bonâ fide* bidder (Huber, *Prælect.* xviii. 2, 7); but it seems to be settled in our law that, unless the estate is advertised to be sold without reserve, a bidder may be privately appointed by the owner in order to prevent it being sold at an under value, though the appointment of more than one such person, or of any one for the purpose of taking advantage of the eagerness of bidders, will be deemed a fraud.

A court of equity looks upon things agreed to be done as actually performed; and therefore when a contract is made for the sale of an estate, it considers the vendor as a trustee for the purchaser of the estate sold, and the purchaser as a trustee of the purchase money for the vendor. If either the vendor or vendee refuse to perform the contract, the other may bring an action at law for breach of contract, or file a bill in equity for a specific performance of it.

If a bill in equity be brought for the execution of an agreement not in writing, and the defendant confess it by his answer, without insisting on the benefit of the statute of frauds, he will be decreed to perform it. The statute may be used as a bar to the relief, though the agreement be admitted, but it cannot be pleaded in bar to a discovery of the fact of an agreement. If an agreement, though not in writing, has been partly executed, that is, if acts have been done by the parties in performance of the agreement, the court will, upon the principle of preventing fraud, decree a specific performance of it. What amounts to part performance is of course a question to be determined in each case; but it may be stated generally that the acts must be such as could be done with no other view than the performance of the agreement, and that they must be substantial, such as the payment of a considerable part of the purchase money. It is necessary also that the terms of the agreement be distinctly ascertainable. Parol evidence cannot be admitted for the purpose of varying the terms of a written argument, but it may for the purpose of showing that the writing does not contain the real terms of the agreement, or that from other circumstances, such as waiver or the like, the plaintiff is not entitled to have it specifically performed. Again, parol evidence is admissible for the purpose of explaining a *latent* ambiguity in the written contract, that is, an ambiguity which does not appear upon the instrument of contract, but arises upon the application of the terms of the contract to the subject-matter of it. But parol evidence cannot be admitted in aid. of a *patent* ambiguity, because that would be in effect to establish a parol argument. Still in some cases parol evidence is admitted to correct mistakes or fraudulent omissions in agreements and deeds; but this is not done without great caution, and only where the different intention of the parties clearly appears. Where a person pretends to sell an interest different from that which he possesses, the general rule is that the purchaser, on discovering the fact, may at once abandon the contract; but there are some few exceptions, such as where the estate was charged with trifling incumbrances for which a satisfactory indemnity can be given, or where the estate was sold by auction, or before a master in chancery, in lots, to some of which only the vendor has a title, when a court of equity will compel the purchaser to take the lots to which a title can be made upon receiving compensation for the value of the others. On the other hand, the general rule is that the purchaser may insist upon having what the vendor can give him, with compensation for what he cannot have. Defects in the *quantity* of the estate are of course more easily made the subject of compensation than defects in the *quality* of it. The vendor is not, as a general rule, obliged to disclose such defects in the subject of the contract as are *patent*, and may be discovered by a vigilant purchaser; and it seems that even wilful misrepresentations by the vendor upon points not especially within his knowledge, or with respect to which the purchaser ought to have made particular inquiry, will not affect the contract. But the vendor is bound to disclose latent defects in the estate within his knowledge, and the purchaser will be entitled to relief for wilful concealment of them. Mere inadequacy of price, unless it be very gross or accompanied with circumstances of fraud or misrepresentation, is not in general a ground for a court of equity refusing its assistance to a vendor;

and a conveyance executed will seldom be set aside on the ground of inadequacy of consideration merely, even though the case be one in which the court might originally have refused a specific performance. But sales of reversionary interests are treated, with reference to adequacy or inadequacy of consideration, upon principles peculiar to themselves and not easily definable. In sales of such interests, inadequacy of consideration, especially where the vendor is an heir dealing with a family expectancy, is considered in itself a proof of fraud, and a ground for setting aside the transaction: also the adequacy of the consideration is considered with reference to the time of the contract and not to the event, and the burden lies upon the purchaser to show that a full and adequate consideration was paid. The practical effect of this doctrine has been to depreciate the value of reversions upon sales much below their calculated value, and consequently often to injure the very persons in whose favour it was introduced. In sales by private agreement it is usual to fix a time for completing the contract, and the time so fixed is considered at law as of the essence of the contract; so that if the one party be not then ready to complete, the other may treat the contract as abandoned: but a court of equity, upon a bill brought for specific performance, exercises a discretion in examining into the cause of a delay in completing a purchase, and will in certain cases, as where it was caused by the act or negligence of the party resisting the performance, or was occasioned by the state of the title, decree a specific performance notwithstanding, if the time fixed for completing the contract is not material. But on the other hand, though no time has been limited by the parties, the court will not assist a party who has allowed his contract to lie dormant for a length of time. Each case however must depend in a great measure upon its own particular circumstances.

It is the duty of the vendor, upon the contract being entered into, or within a reasonable time after, to furnish the purchaser, at the vendor's own expense, with an abstract of his title to the estate, containing a statement of the contents of his muniments of title, and an account of the incumbrances (if any) affecting the estate. Before the late act of 3 & 4 Wm. IV., c. 27, a purchaser had a right to require a title commencing at least 60 years previous to the time of his purchase, because the old statute of limitations could not in a shorter time confer a title; but since that act it may be considered generally that an abstract going back 40 years is sufficient. Nevertheless as formerly a period of 60 years was not always sufficient; as for instance in cases when it might be presumed from the abstract that prior estates tail were subsisting, so cases must still frequently arise in which it will be necessary to go back beyond a 40-years period. Every purchaser has a right to insist upon having a good title, and equity will not compel a purchaser to accept one in any respect doubtful, unless he has entered into a special contract to take the estate with such a title as the vendor can give. It is impossible to enter here into any examination of the numerous circumstances upon which the completeness of a title may depend; but it may be observed that important alterations have been made by the 3 & 4 Wm. IV., c. 106, regulating the law of descent, by the Statute of Limitations of the 3 & 4 Wm. IV., c. 27, and by the Wills Act of the 1 Vict., c. 26., tending to shorten and simplify in many respects the examination of abstracts of title. The seller is bound to produce the deeds required to verify the abstract, if in his possession, or to pay the expense of examining them, if in the possession of another. In short, the general rule is that the vendor should bear the expense of making out the title, while the purchaser should bear the expense of the conveyance.

The meaning and objects of attendant terms have been explained under TERMS OF YEARS.

A purchaser has a right to require that all outstanding terms of which he could avail himself in ejectment should be assigned to attend his inheritance; and as a general rule he should never omit to do so, whether the term has been previously assigned to attend the inheritance or not. It is seldom safe to rely upon a proviso for cessor of the term contained in the deed creating it, as any inaccuracy in the framing of the instrument, or any departure from the conditions on which the cessor was to take place, may prevent it, and leave the term a subsisting interest. Neither is it safe for a purchaser to rely on a former assignment to attend; for though the vendor's trustee, notice given to him of the conveyance, becomes for the purchaser, which might be supposed to purposes, still it is advisable for the purchaser to actual assignment to prevent the possibility of a of the term being afterwards presumed on the ground not having been dealt with as a subsisting estate time of the conveyance.

Before the execution of the conveyance, the should cause search to be made for incumbrances the estate, though none such should appear upon stract. If the lands lie in a register county, the should be searched for prior conveyances, charges of annuities, &c. Judgments, which by the Vict., c. 110, are now made an actual charge debtor's present and future interest in lands, of kind, ought also to be carefully searched for. By the mentioned act, the 2 & 3 Vict., c. 11, and 3 & c. 82, all judgments, in order to affect purchasers, registered in the Court of Common Pleas every it follows therefore that a purchaser should records of that court for five years preceding his except in the case of lands lying in Middlesex, the Registry Act for that county provides that shall not bind lands until registered, it is search be made in the County Register for the mentioned period. By the 18th section of the Vict., c. 110, decrees of courts of equity are to effect of judgments at law, and are to be registered Court of Common Pleas in the same manner. therefore now be searched for in the same way the same periods as judgments. Since the by the 2 Vict., c. 11, ss. 7 & 8, of a registry for *dentes*, and crown debts, and accountants to the purchaser should also search those registers.

A purchaser has also a right to require that the should enter into the usual covenants, which are— he is seised in fee (if the fact be so); 2, that he to convey; 3, for quiet enjoyment by the heirs, and assigns; 4, that the estate is free branches; and lastly, for further assurance. When a sells under a power of appointment, the first ought to be that the power was well created sisting. A purchaser should never accept a relying on the vendor's covenants, without an tion that the covenants are to be an indemnity defect; for otherwise, if the defect was known to time of the purchase, the presumption will be that the estate subject to it. A vendor who actually the estate himself for money or other valuable tion, and obtained proper covenants for title, is to enter into covenants extending beyond his but a vendor who claims through some other descent or devise, is bound to enter into covenants ing to the acts of the last purchaser. When an sold by trustees, the only covenant which the can require from them is that they have done no act cumber the estate, but he will be entitled to the covenants from the *cestuis que trust*, except when estate is sold under a direction in a will or decree court of equity for payment of debts, &c., when for title are dispensed with on account of the expense which would be occasioned in obtaining them every creditor. In general, the vendor, upon the tion of the conveyance, delivers over the title-deeds purchaser; but if, as sometimes is the case, it is that he should retain them on account of their other lands than those sold, he ought to covenant with purchaser to produce them to him as occasion quire. The usual covenants for title entered into vendor with a purchaser pass to the heirs and common law of the vendor, or, as it is technically run with the land. If the purchaser, his heirs or be evicted upon a defect in the title within the for title, he or they may bring an action at law damages; and if without eviction a defect be an action for damages may be resorted to, or, if the can be supplied, a bill in equity may be filed for the formance of the covenant for further assurance.

Upon the principle that equity considers that which agreed to be done as performed, the purchaser is to the profits of the estate, and the vendor to which the court always gives at *four per cent.*

purchase-money from the time of completing the con- t; and if the vendor gives up possession of the estate out receiving the purchase-money, a court of equity, ther a legal conveyance has been executed or not, will sider him to have a lien on the land for the money; this lien extends to the purchaser's heir and to all ons claiming under him with notice of the lien, though aluable consideration. [Lien.] Where a purchaser buys from trustees with notice of the trust, if the instrument ting the trust contain, as it generally does, a clause aring the receipts of the trustees discharges to pur- sers, he has no occasion, after paying his money to the tees and getting a receipt from them, to concern him- about the application of it. But if there be no such ipt-clause, and the property is real estate, the pur- ser must for his own security see that the money is ally applied for the purposes of the trust, unless in es where the trust is in whole or in part for the pay- at of debts generally, an exception admitted on account the indefinite nature of such a trust. If the estate be sehold, which goes to the executor and must be ap- ed with the other personal estate in payment of debts erally, the purchaser is, on the ground above stated, considered bound to see to the application of the pur- se-money, unless he had notice at the time of his pur- se that there were no debts.

is necessary here to make some observations upon the trine of notice as applied to purchasers. Notice may defined to be knowledge which the purchaser either ually has, or is presumed in law to have, at the time of purchase, of the existence of incumbrances or other umstances tending to defeat his estate. Besides ac- notice, which needs no definition, a purchaser may e what is called constructive notice. Constructive ce is in fact no more than evidence of notice which egally conclusive. Thus notice to the counsel, agent, or rney of the purchaser is notice to him. A public act of liament is binding upon, and therefore is notice to all nkind, but not a private act, nor even, it seems, acts of a vate nature declared to be public for the purpose of being licially noticed. A *lis pendens*, if registered under the ict., c. 11, is itself notice to a purchaser, so that he is cted with the costs of and bound to abide by all prior ceedings in the suit. But neither decrees of courts of ty nor judgments of courts of law are of themselves ce. The manner in which judgments and decrees become ce to purchasers has been explained above. It is not easy y what degree of evidence will amount to constructive ce, but it may be laid down that whatever is sufficient t a vigilant purchaser upon an inquiry is good notice; in other words, that wherever a man has sufficient in- nation to lead him to a fact, he should be deemed nizant of it. [Notice.]

s to the protection of purchasers from fraudulent and untary settlements, see Settlement. The Statute of aritable Uses (43 Eliz., c. 4) contains a proviso that pur- sers for an adequate valuable consideration without ice of lands given to charitable uses shall not have their chases impeached. By the 2 & 3 Vict., c. 11, ss. 12, conveyances by bankrupts *bonâ fide* made before the e and issuing of the fiat are declared to be valid not- hstanding a prior act of bankruptcy, provided that the rchaser had at the time no notice of the act of bank- tcy; and purchasers with notice are not to be affected less the fiat issue within twelve months after such act of nkruptcy. Also by the 2 & 3 Vict., c. 29, s. 1, all con- cts, dealings, and transactions with a bankrupt *bonâ e* made and entered into, and all executions and at- hments against his lands or goods *bonâ fide* executed levied before the date and issuing of a fiat against him, e valid as to persons dealing with him or proceeding ainst his property without notice of an act of bank- ptcy. It would seem that the rule as to payments ade to a bankrupt still depends upon the 82nd section of e 6 Geo. IV., c. 16; and that therefore an announce- nt of adjudication in the 'Gazette,' under the 83rd ction, is notice to a person making a payment to a bank- pt. The 87th section of the last-mentioned Act limits e right of the bankrupt to impeach the title of pur- asers under a commission on account of defects in the ceedings; and the 4th section protects under certain nditions a conveyance by a trader of all his estate and fects for the benefit of his creditors. Deeds relating to lands lying in the counties of York and Middlesex, or in the town of Kingston-upon-Hull, are by several acts of parliament directed to be registered; and all deeds not so registered are declared fraudulent and void against subsequent purchasers. Provision has now been made, as before stated, for the registration of judgments, *lites pendentes*, and crown debts; and a purchaser without notice will be protected against them if not duly registered. But as it was formerly held that a judgment, though not docketed as required by the then existing law, was nevertheless good against a purchaser who had notice of it; and the 3 & 4 Vict., c. 82, declaring that notice of an unregistered judgment shall not affect purchasers is not general, but confined to remedies by virtue of the 1 & 2 Vict., c. 110, it seems to follow that a judgment creditor who has not registered his judgment may still, as against a purchaser with notice, avail himself of his remedies under the old law. By the 2 & 3 Vict., c. 11, s. 7, it appears that a purchaser will still be affected by express notice of a *lis pendens* though unregistered; but from s. 8 it seems that notice of an unregistered crown debt is immaterial.

The 54 Geo. III., c. 173, and the 57 Geo. III., c. 100, contain certain provisions for the protection of purchasers from defects in the mode in which sales have been effected for the redemption of the land-tax. Besides these statutable provisions, the courts of equity will in many cases interfere for the protection of a purchaser who bought without notice of incumbrances on the estate. Thus if a purchaser without notice buy or get in the legal estate of a mortgage or any other prior incumbrance by which he can defend himself at law, a court of equity will not interfere to aid an adversary, of whose claim he had no notice, in setting aside the incumbrance; and the court will give the same protection to a purchaser who, though he has not got in the prior legal estate, has a better right to call for it than any other person. Equity also will aid a purchaser for valuable consideration against the consequences of any fraud or undue concealment by the vendor of the defective execution of a power, a defective surrender of copyholds, or a defective conveyance.

Certain persons are, by the general rules of law, under either an absolute or partial incapacity to purchase real estate for their own benefit. Coke lays it down (Co. Litt. 3 *a*) generally that the parishioners or inhabitants of any place, or the churchwardens, are incapable of purchasing lands by those names; but that in London the parson and churchwardens are a corporation for that purpose. Aliens are capable of purchasing lands, but incapable of holding, and, upon office found, the lands go to the king. Also persons guilty of felony or treason, or of the offence of *præmunire*, may purchase, but cannot hold. If they purchase before attainder, the land goes to the lord; if after, to the king (Co. Litt. 2 *b*.). Also corporations, whether sole or aggregate, though they may purchase, cannot hold lands without licence. [Mortmain.] Infants under 21 may purchase, but cannot bind themselves by the contract. They may waive the purchase on attaining 21; and if they have not then agreed to the purchase, the right of waiver remains to their heirs (Co. Lit. 2 *b*.) *Femes covert* may purchase: but their husbands, if they disagree to the purchase, may divest the estate, and maintain trover for the purchase-money; and after the husband's death, the wife or her heirs, whether the husband had agreed or not, may waive the purchase (Co. Litt. 3 *a*.). Idiots or lunatics, it seems, are capable of purchasing; but a purchase by an idiot may be avoided by the king on office found, and a purchase by a lunatic may be annulled by his committee after inquisition. The heirs of idiots or lunatics dying during idiotcy or lunacy may also avoid purchases by them (Co. Litt. 2 *b*, 227 *a*; 2 Vern. 412). Sales by infants, *femes covert*, idiots, and lunatics are subject to be defeated in the same manner as purchases by them. As to the incapacity of trustees to purchase, see Trust and Trustee.

(Sugden, *On Vendors and Purchasers of Estates*, 10th edit.)

VENDS, or WENDS. The general appellation of Vends was given to the Slavonian populations which had settled in the northern part of Germany from the banks of the Elbe to the shores of the Baltic: they were divided into Obotrites, in the present duchies of Mecklenburg, and Viltzes, in Pomerania, between the Vistula and the

Oder; Havelians, in Brandenburg; Sorbes or Sorabes, between the rivers Saale and Elbe; and Lutitzes, in Lusatia.

The name of Vends is now given to the Slavonians of Lusatia, who in the midst of a German population preserve till this day their national language, and in some villages, particularly among the women, a peculiar dress. Their number is supposed to be about 200,000, of whom, since the divisions adopted by the treaty of Vienna, about 50,000 are under the dominion of Saxony, and the remainder belong to Prussia. Three-fourths of them are Protestants and one-fourth Roman Catholics. A great number of distinguished families in Northern Germany are of Slavonian origin, and they may be easily distinguished by the termination of their names, which end in *itz*, *ik*, *nik*, *tsch*, *ow*, *enz*, &c. Such, for instance, are the Bulow, Nostitz, Rauschnik, &c. Leibnitz as well as Lessing were of Slavonian origin.

The language of the Vends, which is divided into three dialects, dates its first literature from the Reformation, but the great difficulty of providing ministers who could preach in that language induced the Saxon government to make efforts to supplant the Vend language by the German. These efforts were so successful, that, out of seventy-two Vendish parishes in Upper Lusatia, sixteen became entirely Germanized. But in the beginning of the eighteenth century more liberal views respecting that question began to prevail, and institutions for the education of Vendish clergy were established at Leipzig in 1716, and at Wittenberg in 1729. The orthography of the Vendish language was fixed in 1689, by Zacharia Birling, a Lutheran clergyman. This language has been much cultivated, particularly in recent times. Many works, chiefly of a religious character, were translated into it from the German, and there is even a successful metrical translation into the same language of several cantos of Klopstock's 'Messiah.'

There are still some remnants of a Slavonian population in the kingdom of Hanover, in the duchy of Lüneburg, in the district of Draewan, which is called on that account the land of the Vends, or Wendland. This population exhibits a marked difference in language and customs from the surrounding Germans. As late as the year 1757 divine service was performed in the Vendish language at a place called Wastrow, but it is now superseded by the German, and the inhabitants speak a mixture of both tongues. There are no other written documents in that language extant except a small vocabulary and the Lord's Prayer. From these documents it appears that this language was nearer to the Polish than to any other Slavonian dialect.

VENEERING, called also *Vaneering* and *Fineering*, in cabinet-work, is the art of laying thin leaves, called *veneers*, of a valuable kind of wood upon a ground or foundation of inferior material, so as to produce articles of elegant appearance at smaller cost than if they were made solid, or composed entirely of the ornamental wood which appears on the surface. Webster, after referring to the German form of the word, *furnieren*, observes, that it seems to come from the root of *furnish*, the primary sense of which is to *put on*. *Marquetry*, which is a more complicated kind of veneering or inlaid work, in which pieces of various kinds of wood, and sometimes of horn, ivory, and metal, are arranged so as to produce an ornamental effect, comes from the French *marque*, *marqueter*, to mark or spot. Small veneers are cut by hand with a thin saw, the block being held firmly in a vice; but large ones are usually cut by machinery, for a notice of which see SAW-MILL, vol. xx., pp. 479, 480. They are carefully brought to the right thickness by fine planes; cut precisely to the required shape; and then glued down to the ground, which should be of dry wood, with strong glue. If the form of the article will permit it, it is then put in a press until the glue is dry; but if not, the newly-laid veneers are covered with a board, which is pressed down either by weights or by poles abutting against the beams in the roof of the workshop. In veneering on curved surfaces a somewhat different course is pursued, but with the same object, that of keeping the veneer in its place until the glue is sufficiently set to hold it securely. The work is afterwards finished with very fine planes and scrapers, and polished with fish-skin, wax, and a brush or polisher of shavegrass. In cutting out patterns for marquetry, exceedingly fine saws, sometimes made of watch-spring, are used, and several thicknesses of veneer are cut together, or if not, the veneer is placed between two other pieces of wood to hold it still and to prevent it from breaking.

VENERICA'RDIA. [SUBMYTILACEA, vol. xxiii., p. 12

VENE'RIDÆ, a family of CONCHACEA.

The genus *Venus* of Linnæus was arranged by him in the second section (*Bivalvia: Conchæ*) of his *Testacea*, *Mollusca simplicia, obtecta Testa calcarea*, between Donax and SPONDYLUS.

He divided the genus into the following sections:—

* *Pubentes.*

Species:—*Dione*, *Paphia*, *marica*, *dysera.*

** *Impuberes subcordatæ.*

Species:—*verrucosa*, *casina*, *cancellata*, *gallina*, [illegible]*tulca*, *flexuosa*, *erycina*, *mercenaria*, *islandica*, [illegible] *maculata*, *meretrix*, *læta*, *castrensis*, *Phryne*, [illegible] *deflorata*, *fimbriata*, *reticulata*, *squamosa.*

*** *Impuberes orbiculatæ.*

Species:—*tigerina*, *prostrata*, *pensylvanica*, [illegible]*tata*, *punctata*, *exoleta*, *borealis*, *pectinata*, [illegible] *edentula.*

**** *Impuberes ovales, supra rimam subangulatæ.*

Species:—*literata*, *rotundata*, *decussata*, and [illegible]

Such is the arrangement of Linnæus in his last edition of the 'Systema Naturæ,' and he characterizes the hinge of the genus as consisting of three teeth, all approximate, the lateral teeth diverging at the apex. He adds as characters, the offspring of a prurient imagination.

The *Conques* of Lamarck are characterized as having at least three cardinal teeth in one valve, the other having as many or less: lateral teeth sometimes.

Lamarck divides this group into two sections:—

1. *Conques fluviatiles.*

These have lateral teeth, and are covered with what Lamarck terms a false epidermis.

Genera:—*Cyclas*, *Cyrena*, *Galathea.*

2. *Conques marines.*

These have no lateral teeth for the most part, and [illegible] an epidermis covering the whole shell with the exception of the umbones.

Genera:—*Cyprina*, *Cytherea*, *Venus*, *Venericardia*

M. Deshayes, in the last edition of the 'Animaux sans Vertèbres,' expresses his opinion that this family [illegible] is very natural, and adds that the two divisions established by Lamarck ought to be adopted; he even thinks that it would be advantageous to give a more equal value to the component parts, and to elevate each of the divisions to the title of families. In the first he would place the greater part of the river-shells which do not belong to the NAIADES. Upon a study of the animal, he considers necessary to introduce *Iridina* into the group of Conques *Fluviatiles.* The shells, he observes, do not present, [illegible] well known, characters of more than a secondary value in comparison with those of the animals. All the animals of the family of *Conques* have the mantle prolonged [illegible]teriorly into two siphons. In the animals of the [illegible] on the contrary, the two lobes of the mantle are separated throughout their contour. The *Iridinæ* have the lobes of the mantle united, terminated by two siphons, but [illegible] retractor muscle proper to those parts, as the *Conques* [illegible]

M. (Dr.) Pfeiffer, in his work on the mollusks of Germany, remarkable for a great number of excellent observations, perceived, observes M. Deshayes, when studying the animals of the genus *Cyclas*, that there was one whose [illegible]terior siphons were much shorter than in the other species, hardly projecting beyond the borders of the shell; and he thought this character sufficient to justify the establishment of a genus under the name of *Pisidium*, a genus however which M. Deshayes does not think it useful to adopt, the characters on which it is founded having but little value.

If, says M. Deshayes in continuation, we examine the *Conques Marines*, the following observations may be made. The genus *Cyrena* is really intermediate between the *Cyrenæ* and the *Cythereæ*, and Lamarck has justly appreciated their relations. We shall see, he remarks, hereafter that the genera *Venus* and *Cytherea* may be united, not after the manner of Linnæus, who placed among his *Veneres* shells really foreign to the genus, [illegible] by establishing in the genus *Venus* two sections representing the two genera of Lamarck. *Venericardia*, M. Deshayes thinks, ought to be suppressed and transferred to *Cardita*, of which it possesses all the characters. *He has*, as we think, successfully shown, in notes appended to the era *Cardita* and *Venericardia*, why they ought to be ted; and moreover why they can neither be suffered to ain in the group *Conques*, nor in the *Cardiacea*. This ng allowed, the *Marine Conques* will be reduced to genera, *Cyprina* and *Venus*, the *Cythereæ* being ted to the last-named genus. To these two genera Deshayes would add ASTARTE, a genus which he ks might find a more fitting place here than among *Tellinidæ* of Lamarck.

he *Cardiacea* of Cuvier consist of the genera *Cardium* th the subgenus *Hemicardium*), *Donax*, *Cyclas* (with subgenera *Cyrena*, *Cyprina*, and *Galathea*), *Corbis*, *lina*, *Loripes*, *Lucina*, *Ungulina*, *Venus*, *Corbula*, and *tra* (including the true *Mactræ* and the *Lavignons*).

he genus *Venus* he divides into the true *Veneres*, *arte* or *Crassina*, *Cytherea*, *Capsa*, and *Petricola*; and defines this great genus *Venus* as comprising a mul- ide of shells whose common character is to have the th and laminæ of the hinge approximated under the *bo* in a single group. They are, he remarks, in general e flattened and more elongated parallelly to the hinge n the *Cardia*. Their ribs, when they have any, are rly always parallel to the borders, which is the opposite the *Cardia*. The ligament often leaves behind the bones an elliptical impression named by modern zoolo- ts the *corslet*; and there is nearly always in front of *umbones* an oval impression designated as the lunule.

he animal has always two tubes susceptible of more or s projection, but sometimes united to each other, and a npressed foot which serves for creeping.

he *Conchacea* of M. de Blainville are divided into the lowing sections:—

1. *Regular Conchacea with the lateral teeth distant.*

enera.—*Cardium* (with its subdivisions); *Donax* · *llina* [CONCHACEA]; *Lucina*, with its subdivisions; *clas*, with its subdivisions; *Cyprina*; *Mactra*, with its divisions; *Erycina*.

2. *Regular Conchacea without distant lateral teeth.*

Genera.—*Crassatella*; *Venus*.

3. *Irregular Conchacea.*

Genera.—*Venerupis*, with its subdivisions; *Corallio- aga*; *Clotho*; *Corbula*, with its subdivisions; *Sphæna*; *gulina*.

M. de Blainville thus defines the genus *Venus*:—

Animal oval or rounded, ordinarily not much com- ssed; the borders of the mantle undulated and fur- ied with tentacular cirrhi in a single row; foot con- erable, compressed, trenchant, for the rest diversiform; tubes moderately elongated and nearly constantly ted; mouth small, semilunar; the labial appendages ier small; the branchiæ wide, short, free or not united, ther between themselves nor with those of the opposite e.

Shell solid, thick, regular, perfectly equivalve, and close, re or less inequilateral; the umbones well marked, in- ning forwards; the hinge subsimilar, two, three, or even r cardinal teeth, more or less approximated, and con- ging towards the umbo; ligament thick, often arched, vex, and external; two muscular impressions, which are tant, united by a narrow ligule, excavated more or less ply backwards, or more or less wide, and rounded pos- iorly; a third small one in front of the anterior for the erior retractor muscle of the foot.

he following are M. de Blainville's subdivisions:—

*

Median tooth deeply divided into two, the anterior portion most advanced. (Genus *Cytherea*, Lam.)

A. Delicate, triangular, convex species, with the um- nes very strongly marked; the borders trenchant; with- d any distinct lunule. Example, *Venus læta*.

B. Thick, subtrigonal species; the borders of the corse- t carinated; without a distinct lunule. (The *Mactroid* enuses.) Example, *Venus petechialis*.

C. Lenticular species, with concentric striæ, without an terior tooth under the lunule, which is very much sunk; e pallial ligule deeply and angularly excavated back- ards; foot of the animal semilunar. (Genus *Artemis*, oli.) Example, *Venus exoleta*.

D. Lenticular species, radiated or subpectinated, without y lateral posterior tooth; the lunule and ligament very uch sunk; the anterior muscular impression narrow and scending; the marginal ligule but faintly marked and not re-entering posteriorly. (The *Lucinoïd Venuses*.) Example, *Venus tigerina*.

E. Thick, solid species, more or less compressed, oval, ribbed, pectinated on the borders; muscular impressions united by a wide but not sinuous ligule. Example, *Venus pectinata*.

F. Thick, solid, subtrigonal species, striated longitudinally; the impressions united by a narrow non-sinuous ligule. Example, *Venus crassa*.

G. Thick, solid species, nearly smooth or oval-elongated, radiated or blotched with colour; abdominal impression forming a rather deep excavation backwards. (*The Meretrices.*) Example, *Venus chione*.

* *

Median tooth bifid, or three cardinal teeth only. (Genus *Venus*, Lam.)

H. Species of elongated, subrhomboidal form, striated, with a non-denticulate border; the three teeth of the hinge very much approximated and very weak. Example, *Venus decussata*.

I. Subrhomboidal species, deeply trellised; the teeth very thick, the ligament entirely concealed; the *umbones* strongly developed; the border denticulated. Example, *Venus corbis*.

K. Thick, solid species, orbicular or suborbicular, with striæ or rather concentric laminæ; teeth very thick; border denticulated. Example, *Venus puerpera*.

L. Cardioïd species, or such as are radiated from the umbo to the base, and thick and solid. Example, *Venus granulata*.

M. Triquetral species, wedge-shaped, thick, solid, striated longitudinally, and denticulated; the edges of the corslet carinated; two great oblique teeth at the hinge; the tubes of the animal very short and distinct. (Genus *Triquetra*, Bl.) Example, *Venus flexuosa*.

N. Solid species, cordiform, compressed, furrowed longitudinally; borders denticulated, the teeth thick, projecting very little; the corselet long and narrow. Example, *Venus casina*.

O. Solid, thick, suborbicular, subequilateral species; two very large divergent teeth in one valve, and two very unequal ones in the other; muscular impressions united by a ligule without posterior sinuosity. (Genus *Crassina*, Lam.; *Astarte*, Sow.) Example, *Venus damnoniensis*.

P. Species with an epidermis, striated, compressed, oval; *umbones* slightly prominent; two bifid teeth in the right valve; and a single entire one in the left. (Genus *Macoma*, Leach.) Example, *Venus tenuis*.

Q. Orbiculo-triangular species, with projecting umbones; a strong bifid tooth in the right valve, entering between the entire divergent ones in the left. (Genus *Nicania*, Leach.) Example, *Venus Banksii*.

M. de Blainville observes that this genus, as circumscribed by Linnæus, is so numerous in species, that the greater part of conchologists are compelled to establish secondary groups in it; but it must be allowed that, from having regard to the hinge only, they are still very far from having succeeded in facilitating a knowledge of it. M. de Blainville says, that he does not pretend to have done better than his predecessors; but nevertheless he has endeavoured to indicate the different typical forms met with among the *Veneres*, and has characterized them from a consideration of many parts of the shell and of the animals. He regrets that, with regard to the last, he has not, unfortunately, seen each distinct form; but he thinks it very probable that the differences between them are not strongly marked. We know, he observes, that the tubes, which are often united, are also sometimes separated, as in *Venus Meröe* and *Venus flexuosa*; and we know, also, that the foot, ordinarily triangular, trenchant, and furrowed inferiorly, is sometimes semilunar and without a furrow. As to the shells, one may perceive that in the division of the *Veneres* properly so called, the pallial impression has always a posterior excavation, moderately deep, whilst in the shell of the *Cythereæ* it is sometimes extremely deep, as in the genus *Artemis* of Poli, and sometimes there are no traces of it, as in the sections *E.* and *F.*, or even in the section of *Lucinoïd Veneres*: and yet these last have entirely the hinge of the *Cythereæ*. M. de Blainville concludes by observing, that he does not know the shells which have served for the establishment of the two last-named genera of Leach. (*Malacologie.*)

M. Rang makes the genus *Cyprina* follow *Amphidesma*:

and *Cyprina* is followed by *Mactra*, *Erycina*, *Cyclas*, *Cyrena* (and *Corbicula*, Megerle), *Galathea* (*Egeria*, De Roissy; *Potamophila*, Sow.), *Crassatella*, *Astarte*, Sow. (*Crassina*, Lam.; *Nicania*, Leach), *Venus*, and *Venerupis*.

The genus *Cyrena* he thus characterises:—

Animal unknown.

Shell with an epidermis, thick, solid, subtrigonal or suborbicular, ventricose, equivalve, inequilateral; umbones eroded; hinge composed of three teeth in each valve, of which the two posterior are bifid, and the lateral teeth nearly always two in number, one of which last is often approximated to the umbo; ligament external and posterior; muscular impressions oval, united by a pallial impression without excavation.

Of these exotic shells, inhabitants of the rivers of warm countries, particularly those of Asia, M. Rang, following Lamarck, makes two groups:—

1.

Shell having the lateral teeth dentilated (*Corbicula*).

Example, *Cyrena trigonella*.

2.

Shell having the lateral teeth entire.

Example, *Cyrena compressa*.

Venus is thus characterised and divided by M. Rang.

Venus, Linn. (*Venus* and *Cytherea*, Lam.)

Animal oval, rather thick, having the borders of the mantle undulated, and furnished with a row of tentacular cirrhi: tubes more or less elongated, and rarely separated; mouth small; labial appendages small; branchiæ wide; foot large, compressed, trenchant, slightly variable.

Shell in general slightly compressed, solid, regular, equivalve, inequilateral; not gaping, very often ornamented with longitudinal ribs, but rarely with transverse rays; umbones very distinct, and a little curved forward; hinge composed of from two to four cardinal teeth united under the umbo; ligament thick, external, and convex; muscular impressions more or less rounded, united by a pallial impression more or less excavated backwards.

M. Rang remarks that the shells, which, after the example of Cuvier and De Blainville, he refers to the genus *Venus*, have been divided into two genera by Lamarck, *Venus* and *Cytherea*; but as this distinction rests only on very weak characters of the shell which are not always completely justified, it results that the limits of these genera are not, in some cases, very easy to define.

The groups proposed by M. de Blainville suffice, M. Rang observes, for the classification of more than a hundred and fifty species, without comprising the fossils, and which are nearly as numerous. M. Rang has only retrenched from those groups that which included the genus *Astarte* of Sowerby, because he does not think that this genus can be preserved.

Habits and Geographical Distribution.—The genus *Venus* (including *Cytherea*) has been found at depths varying from near the surface to 50 fathoms, in mud, and sand, both fine and coarse: species occur in almost all seas.

Mr. Swainson makes the *Venerinæ*, the third subfamily of his *Tellinidæ*, or *Solid and Close Bivalves*, consist of the following genera and subgenera:—

Corbis, Lam.; *Venus*, Linn. (with the subgenus *Crassina*, Lam., and a notification that the other subgenera of *Tellina*, *Venus*, *Cytherea*, and *Donax* are not worked out); *Cytherea*, Lam.; *Donax*, Linn.; *Capsa*, Lam.; *Cardissa*, Sw.; *Cardium*, Linn. (with the subgenera *Cardium*, Linn.; *Lævicardium*, Sw.; *Hemicardium*, Sw.; *Acardo*, Sw.; and *Papyridea*, Sw.).

The family *Chamidæ* immediately follows in Mr. Swainson's arrangement. (*Malacology*, 1840.)

Mr. J. E. Gray places the *Veneridæ* as the first family of his order *Phyllopoda*, with the following genera:—

Artemis, *Cytherea*, *Meroe*, *Gratelupia*, *Trigona*, *Chione*, *Circe*, *Dosina*, *Mercenaria*, *Anomalocardia*, *Cypreria*, *Venus*, *Tapes*, *Venerupis*, and *Clementia*.

The *Veneridæ* are immediately followed in Mr. Gray's arrangement by the *Cyrenidæ*, which comprise the following genera:—

Cyrena, *Geloina*, *Velorita*, *Cyclas*, *Pisidium*.

The *Cardiadæ* immediately follow. (*Synopsis Mus. Brit.*, 1842.) Our limits will only permit a detailed notice of a few genera.

Cyrena.

M. Deshayes, in the last edition of the 'Animaux sans Vertèbres,' remarks of the genus *Cyrena* that there exists a passage between the two genera, but a point is at where the species become very distinct from *Cyclas* reason of their thickness and having one tooth more in the hinge. The animal of the *Cyrenæ* which M. had seen did not differ essentially from that of *Cyclas*, approached nearly to that of *Venus*. It has the two of the mantle united in their posterior third, and on that side by two siphons, which are separated base. They are furnished with a small retractor which leaves a particular impression in the shell.

The number of species of *Cyrena* noted by M. in his tables is fourteen living and twenty-five (tertiary). In the last edition of Lamarck, the recent species recorded is fifteen, and the number twelve only.

Example, *Cyrena fuscata.*

Description.—Brownish-green, with numerous subimbricate furrows; violet within and at the the lateral teeth very much elongated dentilated.

Locality.—The Chinese rivers and those of the (Lam.)

Cyrena fuscata.

Megadesma.

Generic Character.—*Shell* equivalve, subtrigonal, with a greenish epidermis. Hinge-teeth furrowed; the right valves connivent at their base; three in the valve, the intermediate one advanced and Lateral teeth distant.

Ligament external, short, projecting, convex. prominent. (Lam.)

Animal with a thick subtrigonal body; the mantle simple, open below and in front, closed posteriorly, prolonged on that side into two equal tubes the base; two unequal branchiæ, the upper one double, four triangular buccal appendages; mouth foot large, oblong, compressed, subangular (Deshayes.)

M. Deshayes gives the following succinct history genus:—

The only shell belonging to this genus was known Bruguières instituted it. Lister figured a variety in great work, and afterwards Born and Chemnitz also. These authors, embarrassed, doubtless, how to place conveniently, arranged it among the *Veneres*, in which were imitated by Gmelin. Bruguières gave the *Galathea* to the genus, and Lamarck adopted that but M. de Roissy in Sonnini's Buffon, fearing that name, already allotted to a genus of crustaceans LATHEA], might cause confusion, proposed that *Egeria*. 'This name however,' says M. Deshayes, not prevail, because in fact naturalists will always tinguish with facility a genus of crustacea from a shells, even when both bear the same name. If these fects in nomenclature ought to be carefully avoided beings belonging to different classes are the subjects, would be intolerable when existent in genera of the class, and then it is that a glaring error should be rected. As there was not in reality any grave inconvenience in preserving the name of Bruguières, it has maintained in all nomenclatures. Mr. Sowerby nevertheless, in his *Genera of Shells*, believing that he should definitively fix the nomenclature, has rejected both *Galathea* and *Egeria*, and has substituted that of *Potamophila*, which has not prevailed, that of *Galathea* always retaining the preference.'

Now much as we admire M. Deshayes, we must

protest against the principle here laid down. Grave
nvenience *does* arise from giving the same name to
era of different classes; and we are happy to find that
termination to eliminate a name when so employed,
ing it of course as a designation for that genus to
ch it was first attached, is daily gaining ground among
ogists. In the very case before us, if a zoological tra-
er should relate that he had captured a *Galathea* at
e island, without saying whether the capture had taken
e in the sea or in a river, or in his unclassed memo-
lum of Geographical distribution should merely write
name of the genus with the locality opposite, without
her particulars, as he most probably would do,—who,
reading the word *Galathea*, could know whether the
tacean or the testacean animal was meant? Dr. Leach
applied the name of EGERIA to a genus of Brachy-
us Crustaceans; and though the name of POTAMOPHILA
haracteristic, it comes too near to Latreille's POTAMO-
besides which Bowdich's name *Megadesma* has
rity.

spite of the great difference which exists between
lls of *Cyrena* and *Galathea*, observes M. Deshayes,
, in the *Règne Animal*, and M. de Blainville, in
Malacologie, did not adopt the genus instituted by
guières: but then the animal of *Megadesma* was un-
wn. The rivers of India had always been supposed to
he habitat of the shell, but M. Rang met with it in
ndance towards the mouth of the rivers of Malaguette
Africa. M. Deshayes refers to M. Rang's general la-
rs with just praise, and to his excellent memoir on *Ga-*
ea (the shell), in the twenty-fifth volume of the *An-*
s des Sciences Naturelles. M. Deshayes, who had
self examined many individuals, bears testimony to the
ct description of the animal given by M. Rang, and
y observes, that he can add with confidence, to the ge-
c characters of the shell given by Lamarck, those
n from the animal.

xample, *Megadesma radiatum* (*Galathea radiata*,
n.; *Potamophila radiata*, Sow.).

scription.—Under the epidermis milk-white, marked
h violet towards its base, and ornamented with violet
, generally from two to four in number.

cality.—The rivers of Ceylon and of India.

r. Lea, in his *Contributions to Geology* (1833), applies
name *Egeria* to a genus of conchifers (family *Nym-*
a), and describes ten species from the Claiborne beds,
ama. We need hardly add that the name must be
ged.

Cyprina.

neric Character.—Shell equivalve, inequilateral, ob-
ly cordate; umbones obliquely curved. Hinge with
unequal teeth, approximated at the base, subdivari-
above. Lateral tooth distant from the hinge, on the
rior side, sometimes obsolete. Nymphal callosities
e, arched, terminated near the umbones with an ovate
ule.

igament external, often partly immersed under the
bones.

. Deshayes observes that all the characters given by
marck to the genus *Cyprina* are not of equal value, and
hat reason they require an attentive examination be-
a rigorous application of them is made. M. Deshayes
, like Lamarck, in the hinge particular characters,
h, added to those of the animal made known by
ller, are sufficient to maintain the genus. With regard
ever to the great nymphal callosities terminated by a
ule, it is, he remarks, necessary to bear in mind that
callosities are in general very large in the *Veneres*
Cythereæ, whose valves are held together by a very
k ligament. One may remark in some species, and
ecially in those which as they grow old become large
thick, that the anterior extremity of the nymphs
omes carious by degrees, which produces a cavity
ll at first, insensibly becoming larger, and in advanced
sometimes many lines in length. We ought not then
ve to this character such a value as belongs to the
r, in order to introduce species into the genus; for by
wing it rigorously one might arrange *Veneres*, *Cythereæ*,
among the *Cyprinæ*.

. Deshayes then points out means for the recognition
th *Cyprinæ*, which appear to have escaped Lamarck's
tion. The animal has the two lobes of the mantle
d posteriorly, and they terminate on that side in two very short siphons, or rather in two perforations comparable to those of the *Cardia*. These siphons are too short to require a retractor muscle, and for this reason the impression of the mantle is always simple in the true *Cyprinæ*. In the *Veneres* the animal, furnished with longer siphons, is provided with a retractor muscle, which produces a more or less deep inflexion of the pallial impression: finally, in all the *Cyprinæ* there ought to be a posterior lateral tooth on the border, below the termination of the ligament. Thus, in characterising this genus, the presence of the lateral tooth becomes indispensable, as well as the form of the pallial impression.

If, adds M. Deshayes, after having thus rectified the generic characters of the *Cyprinæ*, we seek to apply them to the same species as Lamarck has done, we shall soon find that they agree with one or two species only. Consequently, with the exception of these two species, all the others ought to be taken out of this genus; and M. Deshayes, after examining them in the Paris Museum, where they are labelled by the hand of Lamarck, is satisfied that they all belong to the genus *Venus*.

In his tables M. Deshayes states the number of recent *Cyprinæ* to be two, and of fossil (tertiary) seven. The only species noted as recent and fossil (tertiary) is *islandica*.

The species are generally found in sandy mud.

Example, *Cyprina islandica*.

Description.—Shell cordate, transversely striated, covered with an epidermis; the anterior side subangulate.

Locality.—Northern Ocean, at the mouths of rivers.

There are varieties differing much in size. M. Deshayes gives *Cyprina vulgaris* (Sow., *Genera*) as one of the synonyms of the species.

Cyprina vulgaris. (Sow.)

Fossil Localities—Bordeaux and Italy.

Cyprina occurs below the chalk; three species, for example, are recorded in Dr. Fitton's *Stratigraphical Table*, two of which are not noticed in the last edition of Lamarck.

Cytherea.

Generic Character.—Shell equivalve, inequilateral, suborbicular, trigonal, or transverse. Four cardinal teeth in the right valve, of which three are divergent, approximated at their base, and one is entirely isolated, situated under the lunule. Three divergent cardinal teeth in the other valve, and a fosset at a little distance parallel to the border. No lateral teeth. (Lam.)

M. Deshayes remarks, that if one considers genera as entirely artificial groups, instituted only for assistance to the memory, and rendering the search after species easy—if, because a genus very numerous in species ought to be divided principally with this motive, on the ground of some characters of little value,—the genus *Cytherea* ought, undoubtedly, to be adopted and preserved. But if a genus, to be good, ought to be founded on characters drawn from the organization, if it ought to assemble all the beings that offer those characters, if those characters should never present ambiguity and impossibility in their application, then the genus *Cytherea* ought to be rejected; for, in the opinion of M. Deshayes, it does not unite all the conditions of a good genus. If, observes M. Deshayes in continuation, we examine the animals of the *Cythereæ* in the beautiful work of Poli, we shall find hardly any difference from those of the *Veneres*: the only one indeed that deserves notice, and which only belongs to a certain number of Venuses properly so called, is that the borders of the mantle are fringed, whilst they are entire and simple in the *Cythereæ*. Thus, if one should take this character for the establishment of genera, he must admit not only the *Cythereæ*, but still further divide the *Veneres* as reduced by Lamarck. This division has been recently proposed by Mr. G. B. Sowerby, in his *Genera of Shells*, under the name of *Pullastra*.

The reason which causes M. Deshayes to reject the genus *Cytherea* prevents him, equally, from adopting *Pullastra*. There is, he observes, another genus established long since by Poli, under the name of *Artemis*, and which has more claims for its introduction into the nomenclature than either *Cytherea* or *Pullastra*. The foot of *Artemis* is of a peculiar form, very different from that of *Venus*—the posterior siphons are joined throughout their length; the shells are always orbicular, having the hinge of *Cytherea*, but a clean and deep triangular notch in the pallial impression. This description applies to *Venus exoleta*, Linn., and other approximating species. This then would be the sole admissible dismemberment, not in the genus *Venus* of Linnæus, but in a group which might be formed of the genera *Venus* and *Cytherea* of Lamarck. After this rapid examination of the points drawn from the animals which determine M. Deshayes to reject the genera *Cytherea* and *Pullastra*, he proceeds to inquire whether the shells present constant characters of sufficient value to justify their adoption.

Lamarck states that in *Cytherea* there are constantly four teeth in the hinge. The fourth tooth is very oblique, and always set in that part of the border which comprises the lunule. This tooth is in fact constant in a considerable number of species, but in more than twelve, living as well as fossil, which M. Deshayes had carefully examined, he saw this tooth diminish by little and little, and become so rudimentary, that, it having sometimes escaped Lamarck's notice, the latter comprised many of this species in his genus *Venus* and placed the others among the *Cythereæ*. If, says M. Deshayes in continuation, these observations are just—and it will be very easy to verify them in a large collection of living and fossil species of the two genera—one may ask where the line is to be drawn, and what reasonable ground exists for their separation?

The genus *Pullastra* reposes, as it seems to M. Deshayes, on characters of less importance than that of *Cytherea*. These shells have but three teeth in the hinge; they are, in general, narrow, approximated, and diverge but little; the shell itself is delicate. In admitting with Mr. Sowerby into his new genus the greater part of the species of *Venerupis*, we shall find, says M. Deshayes, a certain number of species which have the teeth small and approximated, but, in proportion as, by analogy, we add other species, these teeth will be seen to become more and more divergent, and to enlarge and thicken in proportion; the shell itself offers numerous modifications and insensible passages towards the *Veneres* properly so called. To this should be added that the animals of *Pullastra* and *Venus* bear a much greater resemblance to each other than to those of the *Cythereæ*; they have the borders of the mantles fringed, the foot of the same form, and the siphons separate. It results from the preceding observations, that zoologists ought to admit one great genus *Venus*, in which the *Cythereæ* and *Pullastræ* may become sections, whilst it will become necessary to withdraw from it *Artemis*, to introduce the last-named genus definitively into the method. (*Animaux sans Vertèbres*, last edit.)

Agreeing as we do with the reasoning above stated, it will be still necessary, for the information of those who choose to retain the genus as a help to avoid confusion in zoology and geology, to give a sketch of the statistics of *Cytherea*.

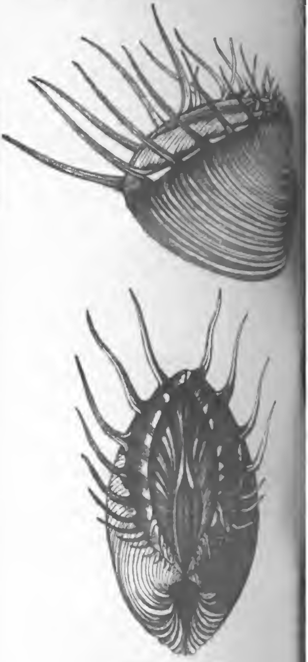
The number of species noted in the tables of M. Deshayes is eighty-five recent and fifty-nine fossil (tertiary): of these *Cythereæ erycina*, *chione*, *nitidula*, *citrina*, *exoleta*, *concentrica*, *lincta*, *rufescens*, *multilamella*, and *venetiana* are stated as occurring both recent and fossil (tertiary).

In the last edition of Lamarck the number of recent species recorded is seventy-eight; and the number of species, fossil only, is nine. Mr. Lea, in his *Contributions to Geology*, adds six species from the Claiborne beds (tertiary of Alabama).

One of the most remarkable species is *Cytherea dione* (*Venus dione*, Linn.).

This remarkable shell, of which there are many va ties, is obliquely cordate in shape, of a rosy, rosy-p rescent, purpurescent, or vinous colour, transversely rowed with elevated lamellæ: the posterior borders shell are beset with spines, very long and distant in varieties, and short and close-set in others.

Locality.—The seas of America.



Venus (Cytherea) dione.

Cytherea meretrix.

Description.—Shell trigonal, smooth, white; th bones spotted; posterior surface olivaceous c anterior side angulate.

Venus (Cytherea) meretrix.

There is a variety zoned with chestnut, with the sides margins white.

Cytherea occurs fossil below the chalk. Thus Dr. ton enumerates six species (none of which are n the last edition of Lamarck) in his *Stratigraphical* and Professor Phillips records *Cytherea dolabra* (con

Bath oolite) in his *Illustrations of the Geology of* *shire.*

Venus.

neric Character.—Shell equivalve, inequilateral, verse or suborbicular.

ree cardinal teeth, approximated, in each valve; lateral ones diverging at the umbo. External liga-t covering the external anterior fissure.

e number of species recorded by M. Deshayes in his s is a hundred and one recent and forty-three fossil iary): of these *Veneres verrucosa*, *plicata*, *gallina*, *ssata*, *radiata*, *Brongniarti*, *dysera*, *geographica*, and *ia*, are noted as recent and fossil (tertiary).

the last edition of Lamarck the number of recent ies recorded is ninety-six, and the number of fossil een.

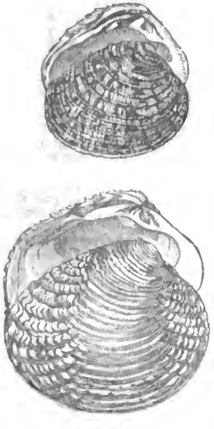
though species of *Venus* are to be found in most seas, are most numerous in those of warm countries, and rally at a moderate distance from the shore.

xample, *Venus cancellata.*

cription.—Shell cordate, longitudinally sulcate, girt elevated, remote, transverse belts; white spotted with brown; lunule cordate.

ality.—The seas of America.

. Deshayes thinks it evident that Lamarck's species is ical with *Venus dysera*, Chemn., that it ought to be ressed, and that a new name should be given to nnitz's variety, which is very distinct. The reader will the synonyms collected and the confusion learnedly velled in the last edition of the *Animaux sans Ver-* *es.*

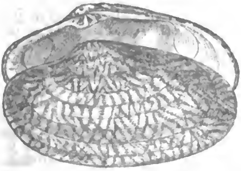


Venus cancellata.

Venus (Pullastra) textile.

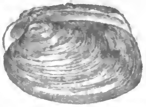
Description.—Shell ovate oblong, very smooth, pale-llow, ornamented with angulate-flexuous, purplish or rulescent lines.

Locality.—The Malabar coast.



Venus (Pullastra) textile.

We subjoin a representation of Venus (*Pullastra? Venirupis?*) *vulgaris.*



For a description of *Venerupis*, see the article LITHOPHAGIDÆ.

Venus occurs fossil below the chalk. See, for instance, many species recorded in Dr. Fitton's *Stratigraphical Table.* Professor Phillips records one from the coralline oolite. (*Geology of Yorkshire.*) See further, Dr. Mantell's *Organic Remains of Sussex*, &c.

We here proceed to notice *Lucina*, according to promise.

Generic Character.—Shell suborbicular, inequilateral, with small, pointed, oblique umbones. Two divergent cardinal teeth, one bifid, and which are variable or disappear with age. Two lateral teeth; the posterior one more approximated to the cardinal teeth. Two very separate muscular impressions, the posterior of which forms a facial prolongation which is, sometimes, very long.

M. Deshayes observes, that the genus *Lucina*, as Lamarck and Bruguières perceived, is very natural; the shells have a particular contour (facies), they are orbicular, the interior surface of the valves is punctuated or striated, sometimes deeply; the pallial impression is always simple, which is an essential character of the genus, as well as the form and position of the muscular impressions. When the genus is studied by means of a great number of species, one soon perceives that the hinge varies much, and that the characters afforded by this part in other groups are here but of small value. Some species have the hinge toothless, others have one or two cardinal teeth, at first obsolete or rudimentary, afterwards larger and more constant. To these cardinal teeth are added, according to the species, the anterior or posterior lateral tooth; and the hinge is not complete, that is to say, is not provided with cardinal and lateral teeth, except in a small number of species. Notwithstanding these continual variations of the hinge, one may perceive that the eighty-six species, both recent and fossil, actually known, bear so natural a relation to each other, that they could not be better placed elsewhere, neither could they constitute other genera. Some zoologists, after the example of Cuvier, retain the genera *Lucina* of Bruguières and *Loripes* of Poli. But M. Deshayes observes, that though the animals of the principal *Lucinæ* are not known, one may conclude by analogy and from the resemblance of the shells, that the identity of the two genera cannot be well contested. He therefore thinks that, as it is not convenient to retain both genera, and as that of Bruguières is best known and as old as Poli's, Bruguières's name should be preferred.

Linnæus placed the greater part of the *Lucinæ* among his *Veneres*. In separating these genera, Bruguières, Lamarck, and the other conchologists left among the *Veneres* some shells which have all the characters of the *Lucinæ*. See further, the last edition of the *Animaux sans Vertèbres*, tom. 6, p. 222.

The number of species recorded by M. Deshayes in his tables is twenty recent, and fifty-nine fossil (tertiary): of these *Lucinæ tigrina*, *punctata*, *columbella*, *divaricata*, *lactea*, *gibbosula*, *squamosa*, *radula*, and *amphidesmoïdes* are noticed as recent and fossil (tertiary).

Mr. Lea adds six species from the tertiary of Alabama.

In a recent state *Lucina* has been found at depths varying from five to eleven fathoms in sandy-mud and mud. Species occur principally in the seas of warm climates.

The well-known *Lucina Jamaicensis*, *Venus Jamaicensis* of the older authors, may be taken as an example.

In a fossil state *Lucina* occurs below the chalk. See the list of 'Organic Remains on the Yorkshire Coast,' in Professor Phillips's *Geology of Yorkshire;* Dr. Fitton's *Stratigraphical List*, &c. &c.

VENERU'PIS, or VENERIRUPIS. [LITHOPHAGIDÆ; VENERIDÆ.]

VE'NETI. [MORBIHAN.]

VENETIAN SCHOOL OF PAINTING. The historians of Venetian art date the commencement of modern painting in Venice from the eleventh century, or about

1070, when the Doge Selvo invited some Greek mosaic-workers to Venice to adorn the church of St. Mark; and in the thirteenth century, after the taking of Constantinople by the Venetians, in 1204, not only works of art, but artists also, are said to have been plentiful in Venice, Venetians as well as Greeks; only two however of the former can now be named, Giovanni da Venezia and Martinello da Murano. On an old wooden sarcophagus of the Beata Giuliana, in the monastery of San Biagio alla Giudecca, there is a painting of about the year 1262; but the painter's name is not known: it is in a rough style, but Lanzi is of opinion that it is not Greek.

I. It was not until after the time of Giotto, who executed some works in Padua and Verona in the beginning of the fourteenth century, that the painters of the Venetian states began to make themselves known by their works. The oldest known works at Padua are by painters of the school of Giotto. The extensive paintings in the church of San Giovanni Battista at Padua are attributed to Giusto Padovano, a scholar of Giotto and a Florentine by birth, though naturalised at Padua. Guariento of Padua was also a follower of Giotto, and was celebrated about 1360: some of his works are still remaining. There are also some works still extant of two celebrated Veronese painters of the same time: of Alticherio da Zevio, near Verona, in the old church of San Giorgio, illustrating the life of St. James; and others of the life of St. John by Sebeto of Verona, in the same church, much in the style of Giotto, especially the former. To these may be added a Jacopo of Verona, who painted some frescoes in San Michel at Padua; and a Gio. Miretto of Padua, who executed some works in the great hall of that place. There were however some painters about this time in Venice and Treviso who painted in what may be termed a national style; and among these may be included the miniature-painters, who were numerous at this time. Among these Zanetti mentions a Maestro Paolo, whose name he found recorded in an antient parchment with the date of 1346. He is the earliest of the Venetian painters whose time and name are known: there is in the church of St. Mark a picture, or ancona, as it is called, by him and his two sons, divided into several compartments, illustrating the history of our Saviour, with the following inscription:—'Magister Paulus cum Jacobo et Johanne filiis fecit hoc opus.' Lanzi says his style reminds us much of the Greek specimens of art. There is another painting by him in the sacristy of the Padri Conventuali at Vicenza, inscribed as follows:—'1333. Paulus de Venetiis pinxit hoc opus.' One of the earliest Venetian painters also was a Lorenzo of Venice, who, according to Zanetti, was paid 300 gold ducats for an altarpiece, formerly in the church of Sant' Antonio di Castello, now in the Academy, on which is his name and the date 1358. There is likewise in the house of the Ercolani family at Bologna a picture inscribed 'Manu Laurentii de Venetiis, 1368:' he was also most probably the painter of the fresco of Daniel in the Lion's Den, in the church of Mezzaratta, near Bologna, marked Laurentius, P.: it was painted about 1370. Another Venetian painter of this time was Niccolo Semitecolo: his name is inscribed as follows upon a painting in the Chapter Library of Padua:—'Nicoleto Semitecolo da Veniexia impense, 1367.' This work is a good specimen of the school: it represents the Trinity with the Virgin, and some stories of St. Sebastian: the nude is tolerably well expressed, and the design is bold; but it bears no resemblance to the school of Giotto: it is inferior in design, yet equal in colouring. There are also two pictures by this master in the Academy at Venice. The celebrated Antonio Veneziano mentioned by Vasari executed some works in Venice about this time, but it is disputed whether he was a Venetian or a Florentine. There are a few other old painters of merit of this period whose names are known: Simon da Cusighe, Niccolo Friulano, and Pecino and Pietro de Nova.

II. In the fifteenth century a very different style prevailed; and although the artists of this period still designed with great stiffness and in the Gothic taste, they produced many admirably coloured pictures as regards the brilliancy and composition of colour, but in the local colours and reflexes they were yet deficient. The leaders of the improved style were some painters of the small island of Murano, and it has the glory of having been the nursery of the greatest painters of Venice: Titian studied at Murano. The first painters of this place were Quirico, Ber-
nardino, and Andrea da Marano; but its great
were the Vivarini. The oldest of this
Vivarini the elder, by whom there is an exc
in its style of John the Baptist in the Venetia
The next in order of time of this family
and Antonio Vivarini, according to Ridolfi
who lived about 1440. That there was a Gio
rini however is doubted by Lanzi. The only
mentioning him is the following inscription
piece in San Pantaleone:—'Zuane e Antonio
pense, 1444.' But this Zuane is, according
German known as Joannes de Alemania and
manus, which is evident from the two fol
tions:—'Joannes de Alemania et Antoni
pinxit,' on a picture now in the Academy, f
Scuola della Carità; and 'Antonio de M
Alamanus pinxit,' on a painting at Padua.
artists of this family were Bartolomeo, the b
tonio, and Luigi Vivarini the younger. In
Antiche Pitture, in the Venetian Academy,
ral pictures by these masters: they differ
from the works of the Bellini. Bartolom
of the Venetians who painted in oil: his fir
is dated 1473; it is in the church of SS. Gio
In the Scuola di San Girolamo there is an exc
of that saint with the lion, by Luigi Vivari
The principal contemporaries and rivals of t
Venice were Jacopo Nerito of Padua and
Bassano the elder, both scholars of Genti
who was employed in Venice in the beg
fifteenth century; also Jacopo Bellini, Fra
son Jacobello del Fiore, and a Morazone;
and Carlo Crivelli, scholars of Jacobello. J
tained great celebrity: there are works by him
parts of the Venetian territory, bearing dates
1432. Donato was superior to his master in
was likewise a Vittorio Crivelli, who lived abo
the fifteenth century.

Besides the painters already mentioned,
others of equal merit in other parts of the
gamo and Brescia. In the former place a C
in the latter Brandolin Testorino and Ottav
also a Vincenzio Civerchino at Crema; Stefano
Sebeto, a painter of great ability, and a V
Stefano, his son, at Verona: the latter was t
Liberale, who became the best painter of V
time. At Verona, also in the latter part of th
century, was Vittore Pisanello, who executed
brated works in Venice and in Rome, but
all perished; there are however yet a few of
at Verona. From the accounts of Pisanello's
appear to have been of a very superior des
cially in design. He surpassed all his cont
painting horses and other animals; he was a
most famous medalists of his time. Jacopo T
Marcello Figolino of Vicenza were likewise
artists of this period; the latter painted in a
manner, and if the period assigned to him by R
correct, 1450, he had a better knowledge of
shade and perspective, and a greater delicacy of
than perhaps any of his contemporaries. Th
master however of this period was Francesco Sq
Padua, who formed there the greatest school of
ever brought together by one man: he had 137
and his museum of drawings and antiques was
known at that period. He had himself travelle
whole of Italy and visited many parts of G
express purpose of making a collection of draw
best remains of antient art. He lived in great
and divided many of his commissions among
The celebrated illustrated book of anthems in
of the Misericordia, commonly ascribed to M
now by competent judges considered one of the
sions of Squarcione executed by his numerous
There is only one work at Padua known to have
by Squarcione, painted for the Lazara family
excellent in colouring, in expression, and in p
Mantegna, Marco Zoppo, and Jacopo Bellini
lars of Squarcione. Trevigi also had its dis
painters at this time: the following are ment
torians: Antonio, Liberale da Campo, and G
Trevigi: San Vito also had its Andrea Bellune
his countrymen thought, rivalled both Zeuxis and

e cathedral of Pordenone, under one of his altarpieces, itten—

> 'Andreas Zeusis nostraeque aetatis Apelles
> Hoc Belluneilus nobile pinxit opus.'

emporary with him was Domenico di Tolmezzo.

I. Towards the end of the fifteenth century, about , a great change took place in the Venetian method olouring: the old methods of painting in distemper mpera), and with gums, &c. (à guazzo), were laid for what is now generally called oil painting. This od was introduced into Venice by Antonello da sina, who had learnt it in Flanders of John van Eyck. er of Bruges, likewise a scholar of Van Eyck, is said to have visited Venice. The first Venetians who dis- ished themselves in the new method were the Viva- and the Bellini. Giovanni Bellini acquired the re- tion of the most distinguished painter of his time in ce: he painted from 1464 until 1516, and executed y works of various degrees of merit, highly finished, antly coloured, but perhaps always in a dry manner; figures however are frequently well drawn, and his ession was often excellent. Unlike most painters, he oved as he grew old, and condescended to borrow ities from much younger masters: he endeavoured in later works to imitate the design and colouring of gione, his own pupil. His elder brother Gentile Bel- though very inferior to him, also acquired a great c; he was sent by the Venetian government to Con- timople to paint the portrait of Mahomet II. and other ks. The Sultan had sent to Venice for a painter. The ol of the Bellini, more particularly of Giovanni, was erous and celebrated; but as, with the exception of gione and Titian, their scholars painted in a style ly identical with their masters, it will be sufficient here ention the names of the principal—Bellin Bellini, Giro- o Mocetto, Nicolo Moreto, Marco Marziale, Giambattista a, Giovanni Martini, and Martino da Udine, or Pelle- o di San Daniello. There were others who painted in erent styles and belong to other schools. Giovanni lini had two distinguished rivals, and perhaps superiors, Vittore Carpuccio of Venice and Marco Basaiti of Friuli: some of the works of the latter are the finest cimens of what may be termed the Gothic style that e ever been produced.

he painters of the Venetian States at the end of the enth century, contemporary with the school of Bellini, very numerous, and many of them painters of great it, though more or less followers of the old style. The were Carlos Cima, Vittore Belliniano, and Jacopo Mon- tana: others, who approached nearer to the new style, Vincenzio Catena, Cordegliaghi, Francesco Bissolo, Girolamo di Santa Croce.

s the school of Squarcione at Padua was opposed to of the Bellini at Venice, and its numerous followers pted a style distinct from that of the Venetian painters, h prevailed elsewhere throughout the state, it is un- essary to mention them here: the best of them ited in the style of Mantegna, who established a dis- t school at Mantua. Francesco da Ponte, a native of enza, and the two Montagna and Bonconsigli, likewise icenza, though born so near to Padua, were followers he school of the Bellini. Francesco da Ponte was the nder of the Bassanese school: Bonconsigli, called rescalco, was the best of all the painters of Vicenza of period; in the Oratorio de' Turchini there is a Ma- na on a throne surrounded by four Saints, by him, ch is by some reckoned the finest picture in Vicenza.

Verona, at this time, the beginning of the sixteenth tury, were Domenico Morone and his son Francesco, also Girolamo da' Libri, who may be reckoned among best masters of the old school; Girolamo da' Libri was most celebrated miniature painter of his time in Italy. scia at this period had also its distinguished painters, Fioravante Ferramola and Paolo Zoppo; and Andrea evitali, a scholar of Giovanni Bellini, acquired a great utation at Bergamo. The art of inlaying with stained ods of different colours was practised with great perfec- n at this time: the following artists are mentioned by nzi as having attained great distinction for this species art—Fra Giovanni da Verona, Fra Vincenzo dalle acche, Fra Raffaello da Brescia, Fra Damiano da Ber- mo, Gian Francesco Capodiferro, and Bartolomeo da la.

IV. Whilst the artists of the neighbouring cities of Venice were with more or less success contentedly following the dry manner of Bellini, it was completely exploded at Venice itself by two of his own scholars, Giorgio Barbarelli di Castelfranco, commonly called Giorgione, and Tiziano Vecellio da Cadore, or Titian. The former was born in 1477, and died in 1511; the latter, born in 1480, died in 1576. Giorgione introduced completely a new style of art: he discarded everything conventional, and worked upon the principle that the exact imitation of the effect of nature as a whole was the true object of a painter, whatever might be the nature or purpose of his representation: the difficulties of execution involved in the carrying out this principle, though a material one, are immense; the greatest of them however, local colour and tone, are those which the painters of Venice appear to have most fully mastered. Mind has ever been less an object of study with the Venetian artists of this and the following periods, than the mere pictorial representation, which appears generally to have been the end of all their works: they painted for the picture's sake only, not for the lesson or moral that the picture might convey, a style properly designated by the ornamental. Giorgione was the first to imitate the textures of stuffs: he painted all his draperies from the actual stuff represented, and painted draperies of many different substances. Before his time all draperies were made of the same material, and differed only in their colours or patterns. He is said to have been first led to the study of tone in light and shade from seeing the works of Lionardo da Vinci. His drawing was good, and his handling bold yet careful. Whether Giorgione, if he had lived longer, would have executed great works, in which every part and object would have been as perfectly executed as some of his single figures and their costumes, must remain a matter of opinion. This excellence was accomplished by Titian, and with a boldness of execution in his best works (in his earliest he finished highly) which far surpasses that of Giorgione; on which account, though originally an imitator of the style of Giorgione, he is deservedly accounted his superior, and is universally considered the founder of the great Venetian school of painting. Titian was in nothing ideal, but true in almost everything that he painted, if not in detail, at least in general effect. His scrupulous imitation of the effect of every object necessarily excluded the ideal from his works; and if his drawing is not the most chaste in style or correct in proportion, it is at least natural, and is not so inferior that his other excellences do not compensate for its inferiority: in composition he was generally simple, but sometimes grand. In colour, local and absolute, he is allowed to have surpassed all other painters; in landscape, few have surpassed him; in portrait, few have equalled him. His principal masterpieces are considered—St. Peter Martyr, in the church of Santi Giovanni e Paolo, and the Assumption of the Virgin, in the Academy at Venice; and the Martyrdom of San Lorenzo, at the Escurial in Spain, or at the church of the Jesuits at Venice: his numerous portraits, and Venuses, as they are called, are well known. [VECELLIO, TIZIANO.] The scholars of these two great painters were numerous. The following celebrated masters were among the scholars of Giorgione: Sebastiano del Piombo, Giovanni da Udine, Francesco Torbido, called Il Moro, Pietro Luzzo, called Larotto (and by Vasari, Morto da Feltro), and Lorenzo Luzzi. The scholars and imitators of Titian were likewise numerous, but the painters who might be strictly termed his scholars are very few. He is said to have instructed his brother Francesco Vecellio, who was an excellent painter, but Titian, through jealousy, according to report, persuaded him to turn merchant: his own son Orazio Vecellio was likewise a good painter, and there were still four other painters of this family: Marco Vecellio, the nephew of Titian; Tiziano Vecellio, the son of Marco, called Tizianello to distinguish him from Titian; also a Fabrizio and a Cesare Vecellio. Of his scholars, the principal were—Paris Bordone, a painter of the greatest ability: he was only a short time the scholar of Titian, and ultimately adopted a style of his own, though varying in nothing essential from that of Giorgione or Titian.

Two of Titian's most celebrated followers were Girolamo di Tiziano and Bonifazio of Verona, though called Veneziano by Vasari and others. To enumerate the followers of Titian, or Giorgione, or those who imitated the characteristics of their styles, would be to enumerate nearly all the painters of Venice of this period, besides many of those of the neighbouring cities. There are however yet a few names to be mentioned of painters contemporary with the two great leaders of this school, who, though they did not paint in their style, yet executed works which, in point of style of design, brilliancy of colour, and composition, are little inferior to theirs:—Lorenzo Lotto, Jacopo Palma the elder, Giovanni Cariani, and Girolamo da Trevigi, an excellent portrait-painter, who was killed in the service of Henry VIII. of England, at Boulogne in 1544. One of the most distinguished contemporaries of Titian also, and his chief rival in Venice, was Gian Antonio Licinio (born 1484, died 1540), commonly called Pordenone, from the place of his birth in the Friuli. He painted much in the style of Giorgione, but with still greater force of light and shade; and he was also one of the best of the Venetian fresco-painters. There were many in Venice who considered that Pordenone surpassed Titian: Zanetti, in speaking of these two rivals, says, in the style of Pordenone there is as much manner as nature, in that of Titian nature predominates. Pordenone formed a numerous school: Pomponio Amalteo was the most distinguished of his scholars, who himself also had many scholars, of whom Sebastiano Secante was a distinguished painter. The following imitators of the style of Titian are also deserving of mention:—Andrea Schiavone di Sebenico, called Medula; Ludovico Fiumicelli, of Trevigi; Francesco Dominici, also of Trevigi; Gio. Battista Ponchino, of Castelfranco; Damiano Maza and Domenico Campagnola, of Padua; Giambattista Maganza, in Vicenza; Alessandro Bonvicino, called Il Moretto di Brescia (a painter of superior powers—he formed several good scholars); and Romanino Savoldo Gambara and Pietro Rosa, of Brescia—the first was the master of Girolamo Muziano, who afterwards distinguished himself at Rome; the second was known at Venice as Girolamo Bresciano. There were also many other painters of merit, of the school of Titian, in various other cities of the Venetian state; but the limits of this article will not admit of them all being enumerated by name.

It remains yet to mention three of the greatest ornaments of the golden age of Venetian painting, as this period is called—Jacopo Robusti, called Tintoretto; Jacopo da Ponte, called Bassano; and Paolo Cagliari, called Veronese. Tintoretto (born 1512, died 1494), so named from the trade of his father, a dyer, is generally called the pupil of Titian, but he remained only twelve days with him, and this at a time when he was very young. [TINTORETTO.] He professed to colour like Titian, and to draw like Michel Angelo: his practice however did not accord with his profession, for, compared with Titian, he was cold in colouring, and extremely heavy in light and shade; he was fond of violent contrasts and great masses of light and shade; in design, though muscular, he was often lean and incorrect; and in his compositions he was fond of many figures, generally thrown together without arrangement. He was however extremely unequal in his works, some of which are amongst the finest productions of the Venetian school; his masterpiece is generally considered the Miracolo dello Schiavo, in the Academy at Venice: he put his name to this picture and to the two following—the Crucifixion, at San Rocco, and the Marriage at Cana, in the Church of Santa Maria della Salute. Many of Tintoretto's greatest pictures are merely dead-coloured, and that in a most careless manner: he was extraordinarily rapid in his execution,—he acquired the name of Il Furioso in consequence: Sebastian del Piombo said that Tintoretto could do as much in two days as he could do in two years. Bassano (born 1510, died 1592) commenced as an historical painter in the grand style, and as an imitator of Titian; but after he left Venice he changed it for an original style of his own in the characteristic style of the Dutch painters, and he was the first to introduce the taste for such works into Italy. He painted landscapes, animals, domestic scenes, kitchens, &c., and various utensils for drinking, &c., particularly of brass. In the church of Santa Maria Maggiore at Venice is a Sacrifice of Noah, in which he introduced all the birds and animals that he had drawn elsewhere: his greatest excellence was his colouring. He brought up four sons as painters, but they were inferior to their father. Paul Veronese (born 1528, died 1588), though in his principles of colouring identical with the other great masters of Venice, from the splendour of his great compositions may be said to have formed a new style of his own. He was fond of crowds of people, arrayed with all the pomp and splendour that the imagination and colour could accomplish, filling his backgrounds with piles of the richest architecture. He was however, as Algarotti says, careless in design, and in costume extremely licentious; but his fancy was noble, his invention inexhaustible, and even his faults are pleasing: one can scarcely look at his magnificent pictures without longing to be a party in the scene. One of his greatest compositions is the Marriage at Cana, in the Louvre, a vast composition, more than 20 feet high, and upwards of 30 wide: it contains about 150 heads, many of which are portraits of the most illustrious and distinguished persons of his time. Paul Veronese was the real master of Rubens. Verona had at this time three other painters little inferior to Paul himself: Battista d'Angelo, called Del Moro, scholar and son-in-law of Torbido; Domenico Ricci, called Brusasorci; and Paolo Farinato, called degli Uberti.

Of the assistants and scholars of Paolo the most distinguished were his brother Benedetto Cagliari, who generally painted his architecture for him; his son Carlo Cagliari, called Carletto, who died young; Gabriele Cagliari, likewise his son; and Battista Zelotti, the most distinguished of all his followers.

V. After the time of the great masters just spoken of, in the seventeenth century the Venetian school of painting declined as much and as rapidly as the Florentine did after the time of Michel Angelo. Many of the Venetians of this period, mistaking apparently brilliancy for art, cultivated little besides colour, and many of their pictures are mere compositions of silks, satins, and other stuffs. There were however several good painters during this period of decline. Jacopo Palma the younger (born 1544, died about 1628) holds a middle place between the great painters of the last period and the mannerists of this: Lanzi calls him the last of the good age and the first of the bad. He painted somewhat between the style of Tintoretto and Paul Veronese; had many defects and many beauties, and produced many bad and several admirable pictures. Boschini relates that Guido and Guercino, when examining a picture by Palma at the Capuchins at Bologna, exclaimed, 'What a pity that such a painter should be dead!' Marco Boschini, painter and engraver, was a scholar of Palma; he is known for an uncritical work on painting, principally on the style and works of the Venetian painters of his own and former times, entitled 'La Carta del Navegar Pittoresco.' The following painters were principal contemporaries of Palma, who painted somewhat in his style:—Leonardo Corona, Andrea Vicentino, Sante Peranda, Antonio Vassilacchi, called L'Aliense; Pietro Malombra, and Girolamo Pilotto. Giuseppe Porta, called Salviati, Matteo Ponzone, the scholar of Peranda, and Pietro Damini, scholar of Gio. Battista Novelli, were likewise three of the best painters of this time.

In 1630 and 1631 many painters were carried off by the plague, which visited Venice in those years; and the excellences of the great masters were after that still more rare in the works of the surviving painters of Venice. In the middle of the seventeenth century the style of M. A. Caravaggio and the Naturalisti began to prevail there, and several foreigners supplanted the Venetian painters in public estimation in Venice itself. The followers of Caravaggio in Venice were, on account of their dark shadows, called by the Venetian painters the Tenebrosi: the pictures of the masters of this school are dark from two causes—from their style of colouring and from their practice of painting upon dark grounds, upon which the middle tints never stand. The pictures painted on such grounds darken after a time, and high lights and deep shadows are all that appear. Of these Naturalisti and Tenebrosi, Pietro Ricchi of Lucca, called Il Lucchese, was one of the best; others were Carlo Saraceni, Francesco Rusca, Stefano Pauluzzi, Matteo da Pitocchi, and Bastiano Mazzoni. Of strangers distinguished in other styles the following were the most successful: Antonio Triva of Reggio, a scholar of Guercino; Bernardo Strozza, his scholar Langetti, and Niccolo Cassana of Genoa; Antonio Bavarense of Bavaria; and Federigo Cervelli of Milan, the master of Sebastiano Ricci. The painters of this period who still followed the style of the

t leader of the Venetian school were Giovanni Con-
o and his scholar Tiberio Tinelli, celebrated portrait
ters; also Girolamo Forabosco, Pietro Bellotti, and
o Ridolfi, well known for his Lives of the Venetian
ters, 'Le Maraviglie dell' Arte, ovvero le Vite degli
ri Pittori Veneti e dello Stato,' 2 vols. 4to., Venice,
, which is one of the best of the Italian works of this
. Ridolfi was a native of Verona, where, of all the
s of the Venetian state, what is more properly the
etian style still prevailed with least deterioration.
io Varotari, the father of Alessandro, called Pado-
ino, Alessandro Turchi, called L'Orbetto, and Pasquale
ni, all amongst the best painters of their time,
e natives of Verona.

adovanino (born at Padua 1590, died 1650) went young
enice to study the works of Titian, and became the
st distinguished painter of this school of the seventeenth
tury, and is one of the best of Titian's imitators: his
sterpiece is the Marriage at Cana, in the Academy at
nice. Scaligero, his principal scholar, also acquired
utation.

nother great painter of Padua of this time was Pietro
eri, sometimes called Libertino, from the character of
naked Venuses, of which he painted many. At Vicenza
beauties of this school were still preserved to a con-
rable degree by Alessandro Maganza, an imitator of
l Veronese and Zelotti; Francesco Maffei, scholar of
anda; Giulio Carpioni, scholar of Padovanino; and Bar-
meo Cittadella, the scholar of Carpioni.

I. At the end of the seventeenth century no particular
e prevailed in Venice, and all the various classes of
nting had their votaries: landscape, architecture, battle,
marine painters were alike numerous. Zanetti states
t there were as many styles as painters in Venice at the
of the seventeenth century. In historical painting
wever the works of the Bolognese painters, as in almost
ry other city at this time, were likewise in Venice the
ef objects of attraction. Still, says Lanzi, the old
sters were not on this account underrated, but were
oken of as the antients of a golden age, whose customs
re to be praised, but not imitated. The colouring of the
inters of this period in Venice was more brilliant than
t of the great masters, but what they gained in bril-
ncy they lost in truth: in drawing however and in
tume some of these painters had the advantage of their
decessors, but in these respects the Venetians were
er very distinguished. Of these painters the following
y be mentioned: Andrea Celesti, who painted some-
es in the style of Caravaggio, but more generally in
style of Paul Veronese than of any other master; and
tonio Zanchi of Este, better known for the number
n esteemed for the merit of his works, painted likewise
metimes in the style of Caravaggio and sometimes in
t of Tintoretto. In the Scuola di San Rocco there is a
ebrated picture by him of the Plague of Venice in 1630,
d opposite to it in that place there is a picture of the
eration from the Plague, by his scholar Pietro Negri.
ancesco Trevisani was also one of his scholars, but he
tled early in Rome. To these may be added the names
Antonio Molinari, Antonio Belluci, Giovanni Segala,
o. Antonio Fumiani, and Niccolo Bambini. The last
s the scholar of Carlo Maratta in Rome, and many of
s pictures are painted entirely in the Roman style. But
more distinguished painter and a better draughtsman
an any of these was Gregorio Lazzarini, who painted in
e style of the best Bolognese and Roman painters of the
riod, though he never left Venice. Antonio Pellegrini
quired a name in various countries of Europe. Jacopo
migoni also attained great celebrity, less in Venice how-
er than in England, in Germany, and in Spain; his pic-
res are extremely bright and brilliant. Other distin-
ished painters of this age entitled to be mentioned were
iambattista Pittoni and Giambattista Piazzetta: the former
s celebrated for his pictures with figures of a small size;
e latter was celebrated for his powerful effects of light
d shade in the manner of Guercino, but through a bad
ethod of colouring, his pictures in a short time lost all
eir beauty in this respect; his execution was rapid and
areless. He was a good caricaturist, and he was remark-
bly popular in his time. One of the scholars of Piazzetta,
iambattista Tiepolo, was the last of the Venetians who
cquired a great name. He was one of the best painters
the eighteenth century, and acquired a great reputation in Italy, in Germany, and in Spain, where he died at Madrid about 1770. He excelled chiefly in fresco, and he painted more in the style of Paul Veronese than of Piazzetta: his style was slight and brilliant, yet not glaring; his works owed their brilliancy to a judicious contrast of tints, and not to any intensity or brightness of colour itself. His drawing was feeble, but this deficiency was in a manner compensated for by the gracefulness of his attitudes. He had a distinguished scholar in Fabio Canale. Although Tiepolo may be termed the last of the great Venetian painters, there were still several of perhaps equal ability in the state. Before mentioning these however, we have yet to notice one of the greatest painters of the eighteenth century, who, though not a Venetian, was first educated at Venice by Cervelli, Sebastiano Ricci, or Rizzi, born at Cividal di Belluno in 1660, and died in 1734. He travelled over Italy, and visited Germany, England, and Flanders, and earned the reputation of a great painter wherever he went. He had a great facility in imitating the styles of other masters: he painted in fresco and in oil. His colouring was rich and agreeable, though he occasionally introduced too much azure in his draperies. His composition and design were graceful; in design he was better than the Venetians: his handling was free and yet not careless. His nephew Marco Ricci was a distinguished landscape painter. Ricci had several scholars: the most distinguished were Gaspero Daziani and Francesco Fontebasso.

It remains now only to mention the distinguished painters of the Venetian state, in the eighteenth century, not already noticed. Antonio Zifrondi of Bergamo, a painter of remarkable facility of execution; and of the same place, Fra Vittore Ghirlandi and Bartolomeo Nazzari, were both excellent portrait painters. In Brescia, Avogadro Bresciano was distinguished for rich colour, elegant composition, and good drawing; likewise Andrea Toresani, but he practised more in Venice and Milan than in Brescia: he was distinguished for landscapes and marine pieces, which he embellished with figures and animals painted in excellent taste. Simone Brentana, though a native of Venice, was domiciliated at Verona, and painted many excellent works there. Of Verona also was Antonio Balestra, who studied at Venice, at Bologna, and at Rome with Carlo Maratta: he painted less in the Venetian taste than in the Bolognese and Roman; he drew well, composed with judgment, and executed many excellent works: Gio. Battista Mariotti, Giuseppe Nogari, and Pietro Longhi, Venetians, were his scholars. The first was a good imitator of his style; the second excelled as a portrait painter, but painted also some historical pieces; the third was distinguished for masks, conversations, and landscapes. Carlo Salis of Verona, and Cavalcabo of Roveredo, both painters of great merit, were likewise the scholars of Balestra; and also another Veronese painter, one of the best of the eighteenth century, Il Conte Pietro Rotari: he excelled in every department of painting except colouring, yet in this respect he was harmonious; his colouring was ashy and melancholy; he died at St. Petersburg in 1762, painter to the empress Catherine II. of Russia. The last of the distinguished painters of Verona was Gio. Bettino Cignaroli, likewise instructed by Balestra: he drew also in the style of Maratta; his masterpiece is perhaps the Flight into Egypt, at St. Antonio Abate at Parma: he died in 1770. The emperor Joseph II. is reported to have said, that he had beheld two very rare things in Verona—the amphitheatre, and the first painter of Europe.

Santo Prunati of Verona, contemporary with Balestra at Verona, was also a good painter; and there was a Pietro Uberti at Venice, an excellent portrait painter. A very distinguished painter also of this period at Venice, though of a different class, was Antonio Canaletto, known throughout Europe for his views in Venice, and other cities in and out of Italy.

(Vasari, *Vite de' Pittori*, &c.; Ridolfi, *Le Maraviglie dell' Arte*, &c.; Zanetti, *Della Pittura Veneziana*, &c.; Lanzi, *Storia Pittorica della Italia; Guida per la Reale Accademia delle Belle Arti in Venezia.*)

VENEZIA. [VENICE.]

VENEZIA'NO, ANTO'NIO, one of the best Italian painters of the fourteenth century, was born, according to Vasari, at Venice, in about 1309, although Baldinucci has concluded from certain documents that he was a

Florentine. He studied with Angelo Gaddi at Florence, and acquired his style of painting. After living some time in Florence, he returned to Venice, and was employed by the Signory to paint one of the walls of the council-hall in fresco, which he did with great credit to himself, but owing to the influence of the jealousy of some of his contemporaries he was not properly rewarded for his work, and he left Venice in disgust. He returned to Florence, and executed some very good works there in the convent of Santo Spirito and other places, but they are all now destroyed. From Florence he was invited to Pisa, to complete the series of the life of San Ranieri, in the Campo Santo, which had been commenced by Simone Memmi. Antonio's frescoes in the Campo Santo are, in the opinion of Vasari, the best paintings there: the works of Benozzo Gozzoli were executed later. Vasari praises the purity of his colouring, which he partly attributes to his never retouching his works when dry. He returned again to Florence and painted in the Torre degli Agli an Adoration of the Kings, a Dead Christ, and a Last Judgment, but they have all now perished. In later life he turned physician, and Vasari says that he acquired as great reputation in one capacity as in the other. He died of the plague at Florence, in 1384, the victim of his desire to save others. His portrait is in the Campo Santo at Pisa, painted by himself. Gherardo Starnini and Paolo Uccello were his scholars.

Vasari praises the chiaroscuro of Antonio and seems to have considered him the best in this respect of his time: his design was also correct and graceful, and he was distinguished likewise for the choice of his attitudes and for the truth and variety of his expression. (Vasari, *Vite de' Pittori*, &c.)

VENEZIA'NO, DOME'NICO, a celebrated painter of the fifteenth century, whose melancholy fate is recorded by Vasari in the Life of the infamous Castagno, as he is called. He was born at Venice, about 1406, acquired the art of painting in oil from Antonello of Messina, obtained a good reputation in several parts of Italy, particularly in Perugia, and was invited to Florence, where he was employed in various places, and also, together with Andrea del Castagno, to paint a chapel in Santa Maria Nuova. Castagno, who could not paint in oil, was jealous of the skill and reputation of Domenico, and, says Vasari, made up his mind to get rid of him. He however pretended to have a great esteem for him, and he courted his friendship, which he had very little difficulty in acquiring, as Domenico was a very simple man. Domenico became strongly attached to Castagno and taught him his method of painting in oil; and they spent their evenings generally together and appeared to be sincere friends: Domenico was fond of music, and was a good performer on the lute. As the works advanced the jealousy of Castagno increased, for though a better draughtsman than Domenico, he was inferior in colouring, and the works of Domenico attracted too much attention to please Castagno, and he determined to put his malicious design into execution. Upon a summer's evening, about the year 1462, Domenico went out as usual with his lute from his work in Santa Maria Nuova, and Castagno refused to accompany him, urging that he still wished to work. However, as soon as Domenico was gone, he started by another route, waylaid him, killed him by striking him on the head with a piece of lead, and returned immediately afterwards to his work, as Domenico had left him, where he was found by those who came to tell him of the accident. Castagno accompanied them to the spot, before Domenico was quite dead, and the murdered man breathed his last in the arms of his murderer, who pretended to be deeply afflicted. It should be mentioned that these facts depend apparently entirely upon a reported confession of Castagno on his death-bed. Domenico was fifty-six years of age when he died, and he was buried in Santa Maria Nuova. His works in this church were never completed, and they have now long since been destroyed, but there is still a picture by him in Santa Lucia de' Magnoli. He excelled in colouring and in perspective: in foreshortening he was very skilful, and good also in design.

(Vasari, *Vite de' Pittori*, &c.; Lanzi, *Storia Pittorica*, &c.)

VENEZIA'NO, AGOSTI'NO, one of the most celebrated of the early Italian engravers, was, as his name implies, a native of Venice, but the date of his birth is not known; he was however born near the close of the fifteenth century. He is called also Augustinus de Musis, and on his celebrated print of the Skeletons he has signed himself Augustinus Venetus de Musis; his family name was probably Muzi. Agostino was the scholar of Marcantonio Raimondi, for whom, in conjunction with Marco da Ravenna, he engraved many works at Rome, chiefly after Raffaelle: he remained with Marcantonio until the death of Raffaelle in 1520, when he worked for himself. It does not appear to have been altogether with Marcantonio from the first time that he engraved, nor is it anywhere stated that he was first instructed by him; he may have joined him at Rome in the year 1516, after he engraved a plate for Andrea del Sarto, which so displeased the painter, that he determined upon not allowing any more of his pictures to be engraved. This print, of which there is an impression in the British Museum, represents a Dead Christ supported by Angels: it is perfectly flat and extremely hard in outline, and it is not at all surprising that Andrea del Sarto should have been dissatisfied with such a production. There are prints marked with Agostino's initials A. V., bearing dates from 1509 to 1536; they are executed much in the style of the prints of Marcantonio, but are very inferior in design and in chiaroscuro. Agostino's outline is generally very hard, and his chiaroscuro weak; he was inferior also to Marco di Ravenna in design, and to Bonasoni in chiaroscuro. He was, according to Strutt, the first who had recourse to stipple engraving. His prints are not few, yet not numerous; they were often copied and his plates retouched, and original impressions are very scarce. His portraits are superior to his other prints. The following are among his best works:—large portraits of pope Paul III., Francis I. of France, Charles V. of Germany, and Barbarossa of Tunis,—all finely-drawn heads and full of character,—there are impressions in the British Museum; the Israelites gathering the Manna, after Raffaelle, supposed by some to have been commenced by Marcantonio, on account of the outlines being better drawn than in the majority of Agostino Veneziano's figures; the Four Evangelists, and a Nativity after Julio Romano,—the Nativity, which is dated 1531, is one of the engraver's best prints as regards chiaroscuro; in drawing it is not good, but he engraved also after Julio Romano, Hercules strangling the Serpents, which is very well drawn. The large print of the Skeletons or Burying-place, after Baccio Bandinelli, is Agostino's masterpiece: it contains many emaciated figures, two skeletons, and the figure of Death holding a book; he has marked it with his name in full, 'Augustinus Venetus de Musis. Faciebat. He engraved also, after Bandinelli, a Cleopatra, and the Massacre of the Innocents, which according to Vasari was the largest plate that had been then engraved; an interesting plate of the School of Baccio Bandinelli at Rome, marked 'Academia di Bacchio Brandin. in Roma, in detto Belvidere. 1531. A. V.;' part of Michelangelo's cartoon of Pisa, called the Climbers; and a group from Raffaelle's School of Athens. He engraved many plates after Raffaelle, but some of them are very indifferent; Vasari says that Agostino and Marco di Ravenna engraved almost all the designs of Raffaelle. Agostino copied also on copper some of the woodcuts of Albert Dürer: there is a print in the British Museum of the Last Supper, in which Agostino has perfectly preserved the character of the original, and yet has produced a much more elegant work as regards execution. There is in the British Museum a very good collection of the works of Agostino Veneziano.

VENEZUE'LA is a Republic in South America, extending over the north-eastern portion of that continent, and being situated between 1° 8′ and 12° 16′ N. lat., and between 58° 16′ and 71° 24′ W. long. On the north it is bounded by the Caribbean Sea, on the west it borders on New Granada, on the south on Brazil, and on the east on Brazil, English Guyana, and the Atlantic Ocean.

The boundary between Venezuela and New Granada has been determined by a treaty, according to which it runs along the following line:—it begins on the Caribbean Sea, at Cape Chichibacoa, on the peninsula of Goajira, 12° 15′ N. lat. and 71° 22′ W. long., runs through the middle of the peninsula, and along the elevated ground which constitutes on that side the boundary of the basin of the Lake of Maracaibo, until it meets the sources of the Rio del Oro, when it follows the course of this river up to its confluence with the Catatumbo. From this point it extends along the base of the high grounds lace where the river Grita falls into the Zulia. Hence sses by a short curve to the river Guarumito, whose e it follows upwards to the glen of China, through h it runs to the source of the Don Pedro river, along e bed it descends to the Rio Tachira, running after- s along the Tachira to its source in the Andes. It passes the Andes, and descends along the Rio Nula e mountain-mass called the Desparramadero del Sarare, h is left to the west of it, the line running southward e banks of the Rio Arauca. This last-mentioned constitutes the boundary as far as the Paso del Viento 1′ N. lat. and 69° 14′ W. long.). From this point the runs due south, traversing the Rio Meta near El Apos- ro, the Guaviare near the mouth of the Guamuque, the da at the rapids (raudal) de Manuerico, the Guainía e the mouth of the Napiari, and terminating near the ces of the river Memachí, an affluent of the Guainía, io Negro. The boundary-line between the two re- ies is about 1090 miles long.

he boundary between Venezuela and Brazil begins on west at the sources of the Rio Memachí, and runs ward over a swampy region, which here forms the shed between the Guainía and Uapes to the Piedra ucui, near the banks of the Rio Negro, equally dis- from S. Carlos de Rio Negro on the north and osé de Marabitanos on the south. Having passed Rio Negro, it continues along the line of separation een the rivers Cababuri and Baria to the middle of course of the Rio Maturaca, which during the rainy on constitutes a water-communication between the aburi and Baria. Hence it runs along the ranges h form the watershed between the rivers running hward to the Orinoco and southward to the Rio Negro, l it reaches the Sierra Pacaraima, along which it is osed to continue to the place where the Rupunoony the Essequibo. This line is about 1880 miles long, in some places it is still disputed.

till more disputed is the boundary-line between the ish possessions and Venezuela. The British consider countries drained by the western affluents of the Esse- bo, as far north as the Rio Cuyooni, to belong to them; they also claim the lower part of the basin of the ooni, with all the coast between the mouths of the rivers quibo and Orinoco. The republic however considers course of the Essequibo, from the mouth of the Ru- oony to that of the Cuyooni, as the boundary-line. r line then follows the course of the Cuyooni to the h of the river Tapuru, and passes along its course to its es in the Sierra Imataca, whence it crosses the moun- to the sources of the river Morocca, which serves as e of separation as far as its mouth in the Atlantic an. Either of these two lines may be about 330 miles The estimates in this article are made according to boundary-line claimed by the British.

a-coast.—The Boca de Navios, or principal mouth of river Orinoco, must at present be considered as the t eastern point of the sea-coast of Venezuela: from point the coast extends in a general west-north-west ction to the innermost recess of the gulf of Paria and the insula of Paria, a distance rather exceeding 200 miles. whole of this tract is very low, and a part of it is co- ed by the sea at high-water. It is composed of a great nber of islands, which consist of alluvium brought down the Orinoco and the Rio Guarapiche, which traverse it several channels; and it is overgrown with trees, ch in some parts are high, but in others are only hes. The peninsula of Paria divides the gulf of that e from the Caribbean Sea. It is occupied by a ridge igh rocks, which on the southern side approach near sea and form several small harbours, which lead to ns covered with high trees and watered by rivulets. e northern shore, on the contrary, from the Punta de ia to the Punta d'Araya, presents only naked rocks, s elevated than those along the gulf of Paria, which in ne places also come close up to the water, but in others ede to some distance, leaving along the shore small ins, the soil of which is arid and sterile. The shores of gulf of Cariaco are also elevated on the north as well n the south, and generally as destitute of wood and as ile as the northern part of the peninsula of Araya. The ated coast which surrounds the gulf of Cariaco shelters gainst the swell and against all prevailing winds, and lers its waters as smooth as a lake. It may therefore be considered a very large and safe harbour. The extent of this high coast, from the mouth of the Guarapiche to the town of Cumaná, is not less than 360 miles. Between Cumaná and Barcelona the coast is of moderate elevation, but rather steep, and it contains several good harbours. Between the high and rocky islands which lie along this coast are some narrow straits, but they are deep enough for large vessels. This tract is about 72 miles long. From Barcelona to Cape Codera, which are about 128 miles distant from one another, the shores are low and sandy, and in most places covered with salt-swamps, lagoons, or morasses. Near the mouth of the Rio Unare there are two isolated high hills. The coast between Cape Codera and Puerto Cabello is very high. Mountains rise like a wall from the water's edge, with a steep ascent to a great elevation. It contains several harbours, but they are mostly open: its extent is about 155 miles; from Puerto Cabello to La Vela de Coro is 165 miles. West of Puerto Cabello the shores sink nearly to the level of the sea, and the high grounds recede from the sea, but at a few points the ridges approach near to it. In general the coast is low, sandy, and arid, but in many parts covered with mangrove-trees (Rhizophora mangle), and in others swampy and overgrown with bushes. The isthmus which connects the peninsula of Paraguaná with the continent is about 18 miles long and 3 wide, and consists of low sandhills, interrupted by some swamps and small lagoons. The peninsula of Paraguaná is occupied by an isolated mountain-mass, called El Cerito de Santa-Ana. Its eastern shores are rather low, but they rise to a considerable elevation at Cape San Roman; farther south they have only the height of moderate hills: there are several small harbours on these western shores of the peninsula. The coast-lines round the peninsula, and those of the isthmus which connects it with the mainland, are about 180 miles. Farther west, as far as the channel of the lake of Maracaibo, the coast is low, sandy, arid, and in some places covered with swamps or lagoons; and the same description of coast continues westward on the islands of Zapara and San Carlos, and, west of them, on the peninsula of Goajira to Corojo, at which place it rises to some elevation, and this elevation generally continues to Cape Chichibacoa, the most western point of the coast of Venezuela. The last portion of the coast is about 324 miles long. The whole coast-line of the republic is 1584 miles, of which about 150 miles are washed by the Atlantic Ocean, an equal extent borders on the gulf of Paria, and the remainder forms the southern shores of the Caribbean Sea.

Surface and Soil.—Venezuela contains three distinct mountain-regions, extending respectively over the north-west, the north-east, and the south-east parts of the republic. The north-western parts are occupied by the Andes and the mountains of the coast, which are connected with the Andes; the north-eastern districts are mostly covered by the ranges of the Sierra de Bergantin; and the south-eastern region comprehends the western portion of the Sierra de Parima. These mountain-regions are separated from one another by plains. According to the estimates of Codazzi, the mountain-regions do not occupy quite one-fourth of the republic, namely, about 8000 Spanish leagues, or 96,000 square miles; whilst the plains extend over about 26,000 leagues, or 312,000 square miles. The whole area of the republic is above 400,000 square miles, and is equal to twice the extent of France.

The Mountain-region of the Andes and the Coast-range (Sierra Costanera).—The Andes of Venezuela are the most northern portion of the Eastern Andes of New Granada. Before the range leaves the territories of New Granada it divides, south-west of the town of Pamplona, into two branches, one of which runs north, with a small inclination to the east, whilst the other extends to the north-east. The western of these two ranges, which encloses the basin of the lake of Maracaibo on the west, is called in the south Sierra de Ocaña, in the middle Sierra de Perijá, and on the peninsula of Goajira, where it terminates with Cape Chichibacoa, it is called Montes de Oca. This chain, from the sources of the Rio del Oro to its termination on the Caribbean Sea, constitutes the boundary-line between Venezuela and New Granada; but its southern portion is entirely within New Granada. The highest summit of the Sierra de Perijá is said not to exceed 4200 feet above the sea-level. The whole of the range is covered with thick of Utapa and Varinas. The tobacco of Varinas is well known in Europe, but that of Cumanacoa in the Bergantin mountains is said to be better.

Maize is most extensively cultivated all over the country, but wheat only in the more elevated tracts, especially in those which are more than 1800 feet above the sea-level. Rice is grown in a few places in the lower tracts, and barley only on the declivity of the Andes. Millet is an object of cultivation. The plantain (*musa paradisiaca*), is cultivated in all the districtis that are fit for agriculture, but above 7000 feet the cultivation ceases to be advantageous. The roots which are cultivated as food are chiefly potatoes, batatas (*convolculus batatas*), yucca (*jatropha manihot*), &c. The cultivation of almost every kind of leguminous plants is considerable, especially beans, haricots, lentils, vetches, and garbanzas. Melons and water-melons are much attended to, but vegetables are in general neglected. The following table shows the relative importance of all the great articles of agriculture. It is founded on the crop of 1839, and taken from Codazzi's work:—

Article of Cultivation.	Value in Spanish dollars.	Article of Cultivation.	Value in Spanish dollars.
Cacao	2,278,850	Sugar	1,376,094
Plantains	1,559,811	Indigo	575,000
Maize	6,000,000	Wheat	1,440,000
Yucca	2,712,071	Batatas, apio, &c.	1,390,000
Potatoes	2,173,776	Leguminous vegetables, rice, millet, melons	1,500,000
Cocoa-nuts	350,000		
Tobacco	562,824		
Cotton	525,000		
Coffee	3,309,371	Total	25,752,797

According to this account the whole value of the agricultural produce amounted to 25,752,797 Spanish dollars, or 5,722,844*l*.

The number of fruit-trees is great, but the cultivation is little attended to. Besides the vine, which succeeds well in some of the higher valleys, the fig, pomegranate, orange, lime, and lemon have been transplanted from Europe. Some of the indigenous trees bear excellent fruits, among which the most remarkable are the *Laurus Persea*, *Annona squamosa*, *Annona Humboldtiana*, *Sapota mammosa*, the pine-apple, and the tamarind.

The domestic animals constitute one of the principal branches of the wealth of Venezuela. The large plains supply pasture for cattle, horses, mules, and asses, and the number of these animals is very great. It is also considerable in the other districts, as the greater part of the country is uncultivated. Sheep and goats are also generally kept, but are only numerous in the mountains of Nirgua and the hilly tract which lies north of them. Pigs abounds in the valleys of the mountain-ranges and the countries contiguous to them. According to an estimate of Codazzi, the number of cattle amounted in 1839 to 2,086,727, that of sheep and goats to 1,910,342, that of mules to 39,338, that of horses to 78,164, and that of asses to 140,507: there were also 362,507 hogs. A large number of these animals, especially cattle and horses, are annually sent to Trinidad, whence they pass to the other Antilles. Formerly a considerable quantity of jerked beef was exported, but this article has greatly fallen off since 1810. Many fowls, turkeys, pigeons, ducks, and guinea-hens are reared, and also some geese and peacocks.

Codazzi gives a list and description of 14 different kinds of monkeys and apes found in Venezuela. They are eaten by the aborigines. The carnivorous animals are numerous, among which the largest are the jaguar, called in the country tiger, the puma, the ounce, which is found in the forests of the Sierra de Nirgua, and the tiger-cat. The principal wild animals which are considered game are the tapir, the capybara, the venado, a kind of deer, the aguti, porcupine, rabbit, and several kinds of wild-hogs. Other remarkable animals are the sloth and ant-eater. Two kinds of whales, the physeter and narwhal, are frequently met with along the northern coast; and in the large rivers are the manati, and the tonina: the latter is a kind of dolphin, which attains a length of 9 or 10 feet. The birds are numerous, especially those belonging to the falconidæ, ardeidæ, strigidæ, turdidæ, tanagridæ, picidæ, and psittacidæ; among the last-mentioned the loris are distinguished by the beauty of their plumage. There are also pelicans, wild geese and ducks, and flamingoes.

Fish is abundant in the sea, the rivers, and lakes, and lagunes. The greatest fishery is carried on in the strait which divides the peninsula of Araya from the island of Margarita, round the island of Coche, where a great quantity of a fish called liza is taken, salted, and exported to all the ports of the republic and the West Indies. The salted and dried eggs of the fish are also a considerable article of commerce. The fisheries in the lake of Maracaibo and the lagune of Tacarigua are less important. All the rivers, but especially those which originate in the Andes and fall into the Orinoco, abound in fish. Among the different kinds found in these rivers is the electric eel, and the caribbe, a small fish which is very greedy of animal blood, and wounds men and animals that pass the rivers. Two species of turtle are found in the sea, and much esteemed for their flesh and eggs. But the [illegible] kind is in the Orinoco and other large rivers: it deposits its eggs on islands and sandy tracts, where the river turns from south to east. In March and April these eggs are collected, and manteca is made of them, which is an important article of commerce. Manteca is also made from the fat of the manati.

The alligator abounds in the Orinoco, Apure, and Portuguesa, and is also found in several other rivers. The iguana is eaten, and considered a dainty. The [illegible] is common in some parts. There are boa-constrictors and several venomous snakes. The pipa abounds in the [illegible] Mountains. Pearl-oysters were very abundant at the the discovery of America in the strait between the peninsula of Araya and the island of Margarita, and a very advantageous fishery was carried on for several years, but the banks were soon exhausted, and at present they are not regularly fished. Wild bees are numerous in some districts, but the wax collected is difficult to bleach. In the hilly tract between the Golfo Triste and the lake the cochineal insect is found, but it is not turned to any account.

Venezuela is not rich in minerals. Gold is found in several places, and has been worked in a few since the country has been settled by the Spaniards, but the produce was so small, that the working was given up long ago. Silver-ore has been found near Bailadores on the declivity of the Andes, but in small quantities. Tin is found near Barquisimeto, and was worked for a time, but did not [illegible]. The only mines which are worked are those of copper, not far from San Felipe, at Aroa, which yielded in [illegible] about 1500 cwt. They are at preseut in the hands of an English company, which sends the ore to Swansea to be smelted. They exported in 1837 about 70,530 lb. of ore. Iron and lead ore occur, but are not worked. Coal is found at some places in the Coast-range, especially in Coro, but it is not turned to any account. A kind of natron is extracted from a small lake on the southern declivity of the Andes in the province of Merida, which is mixed with tobacco. At several places petroleum occurs, especially in the peninsula of Araya. Salt is produced to a great amount in the salt-works of the peninsulas of Araya and Paraguana, and in the gulf of Maracaibo.

Inhabitants and Population.—The population consists of aborigines, of two foreign nations which have settled among them, the Spaniards and Africans, and of the offspring which has resulted from the mixture of these three nations. According to the old records, it is evident that at the time of the arrival of the Spaniards the aborigines of Venezuela formed above 150 tribes, each speaking its dialect, and these numerous idioms belonged to eleven or at least six different languages. The number of aboriginal tribes still within the territories of the republic hardly exceeds forty, the others having disappeared; but it must not be supposed that they have been destroyed by the Spaniards. A large number have intermarried with Spaniards or Africans, or have so adopted their mode of living, that their descendants probably form the bulk of the mixed race. This has been especially the case with all the tribes which inhabited the mountain-ranges and the table-lands between and south of those mountains: for if the Goajiros and Warrows (Guaraunos), who live at the western and eastern extremity of the republic, are excepted, there are no aboriginal tribes north of the Orinoco and Apure rivers. In most cases it is quite impossible to recognise in the mixed race the original features of the aborigines; but at several places they have been preserved. Among them are chiefly remarkable the inhabitants of the declivities of the Andes, who in their features so much resemble those aborigines who inhabit the table-lands of New Granada, that it is supposed they belong he nation of the Muyscos, who before the arrival of the niards had established a regular government there, and advanced nearly as far in civilization as the Peruvians he inhabitants of Mexico.

he Indians of pure blood are distinguished by a large d, narrow forehead, lank and long black hair, eyes of dling size, sharp nose, wide mouth, thick lips, and ad face. They are generally copper-coloured, some dark, others almost as fair as Europeans. Their sta- usually varies between four feet and a half and five , though the Caribbees are from five to six feet high. y have little hair on those parts of the body where it ws naturally; but they are not altogether beardless. ir limbs, large and muscular, have the appearance of at strength, but they support hard labour with difficulty. se tribes must not be considered so low in civilization he savages of Brazil, or those of the northern portion North America. There are indeed a few who live only wild fruits, and the produce of the chase and their ing, and have no fixed habitations. But the greater t of them are acquainted with agriculture, and cultivate ton, plantains, yucca, batatas, and even the sugar-cane, at least some of these articles. They live in houses, some tribes have substantial ones. But all of them go rly naked.

he most populous of these tribes are the Guajiros, who abit the peninsula which bears their name, on the t of the gulf of Maracaibo, about 9000 in number; the rrows or Guaraunos, in the delta of the Orinoco, and neighbourhood, about 8000 in number; the Caribbees the rivers Cuyooni and Caroni, 2000 in number; the aicas on the banks of the Cuyooni, 1800 in number; Maquiritares, who reside on the eastern banks of the noco, above the rapids of Maypures, 3600 in number; Guaharibos and Guaicas, occupying both sides of the noco, where the river issues from the Parime Moun- s, each consisting of about 1200 individuals; the irianos and Etanamos, living within the Parime Moun- ns, at some distance from the banks of the Upper Ori- co, each composed of about 1500 individuals; the Piaroas ing within the same mountains opposite the rapids of ypures and Atures, containing about 2000 individuals; d the Guahibos, who are established on the west side of Rio Orinoco, on the rivers Vichada and Meta, compris- about 1800 individuals. The other tribes are small. ew are composed of less than 200 individuals, but the ger number varies between 200 and 1000. The whole riginal population, according to the statement of lazzi, consists only of 52,415 individuals belonging to independent nations, and 14,000 individuals who have n subjected to the whites. Codazzi gives the following le of the different constituents of the population :—

ndependent tribes	52,415
ubjected Indians of pure blood . . .	14,000
ndians mixed with the other population, who have adopted the manners of the other inhabitants, but preserve the characteristic features of their race	155,000
Whites or creoles, the descendants of Spaniards and foreigners	260,000
he mixed race, mulattoes, mestizos, zambos, tercerones, and quarterones	414,151
Negroes or slaves	49,782
	945,348

Respecting the slaves, it is to be observed, that the laws the republic forbid the importation of slaves; and that a law of the republic of Columbia, made in 1821, which s ratified by the legislature of Venezuela in 1830, the spring of slaves are to be free, so that in about 30 ars slavery will be extinct in this country.

Political Divisions and Towns.—After the republic of lumbia had been dissolved (1830), that of Venezuela was ided into 13 provinces, 88 cantons, and 523 parishes. elve provinces are on the continent, and the thirteenth the island of Margarita.

1. *The Province of Maracaibo* comprehends the north- stern districts of the republic, extending over the coun- that surrounds the lake of Maracaibo. Along its stern border is the Sierra Perija, and in the southern and th-eastern districts the lower parts of the offsets of the les and of the hilly region of Coro. The northern dis- ts have a dry arid soil of moderate fertility, but this part alone is inhabited and cultivated, as the southern districts are covered with immense swamps and forests, and generally uninhabited. The articles of commerce which are cultivated are cacao, coffee, and cotton, with some sugar and indigo, and as articles of food rice, plantains, maize, yucca, and some leguminous plants and roots. That part of the peninsula of Guajiros which belongs to Venezuela constitutes a part of this province, and is inhabited by the Guajiros, and a few smaller tribes subject to them.

The town of Maracaibo is built on the western shores of the strait which connects the great lake with the Gulf of Maracaibo. It stands on the north shore of a small inlet which is about two miles long and runs westward into the land. This inlet is the harbour of the town. There are some good buildings, but the greater part of the houses are of wood and thatched. The town has a considerable trade, as it is the harbour of the provinces of Merida and Trujillo, and also of several districts of New Granada, especially those surrounding Cúcuta, from which cacao, coffee, honey, sugar, conserves, tobacco, ropes, and some smaller articles are brought to Maracaibo, and then exported by English, American, Dutch, French, and Danish vessels. By the same way these provinces are supplied with European articles and with salt. This town has a college and some schools, among which is a school of navigation. The inhabitants of this region are rather fond of a sea-faring life. In 1828 they had 346 small vessels for the transport of merchandise, and 1700 boats. A considerable number of vessels are built here, the forests on the southern banks of the lake supplying abundance of excellent timber. The population is 14,000. Altagracia is built on the opposite side of the strait, but several miles from the shore. San Carlos de Zulia stands not far from the southern extremity of the lake, on the banks of the river Escalante: at this place the merchandise sent from Trujillo, Merida, and Cúcuta is embarked for Maracaibo.

2. *The Province of Coro* extends over the hilly region between the lake of Maracaibo on the west and the Golfo Triste on the east. The soil of more than one-half of the province is very sandy and dry, and can only be used for the cultivation of cotton and as pasture-ground for sheep and goats; but the remainder, which is more elevated, has a better soil, and yields good crops of coffee, cacao, maize, yucca, and plantains, with several leguminous plants and roots: sugar is only grown in a few places. In this province alone pulque, or the spirituous liquor extracted from the maguey (Aloe Americana), is made. Along the sea-coast, and especially on the peninsula of Paraguaná, which belongs to this province, great quantities of salt are made.

Coro, the capital, stands on an arid plain, about two miles from the sea and 100 feet above its level. Very good hammocks are made in this town: the population is 4000. It carries on a little trade with the Dutch island of Curaçao by means of the small harbour called Vela de Coro, which is about seven miles from the town. Cumarebo, a small place, about three miles from the small harbour of the same name, has also some commerce.

3. *The Province of Barquisimeto* lies south of Coro and extends over the greater part of the Sierra de Nirgua, and over the most north-eastern portion of the Andes, including the Páramo de Rosas. It presents a great variety of surface and soil, being covered with a succession of valleys, and ridges of hills and mountains, and containing several extensive level tracts at various elevations above the sea. The western districts, or those whose drainage runs to the lake of Maracaibo, partake of the dry and arid soil of the province of Coro; the central districts have abundance of water, but are well drained, healthy, fertile, and populous; whilst those to the north-east extending to the Golfo Triste are covered with high trees, and are exposed to inundations, unhealthy, and thinly inhabited. Nearly all the productions of Venezuela grow in this province; and in some elevated districts excellent wheat is raised. The copper-mines of Aroa are situated near the boundary-line of Coro. The articles of commerce, cacao, coffee, hides, sugar, and indigo, are sent to Puerto Cabello or to Carácas, whence they are exported; but the towns of this province have a considerable commerce with Barinas, which province they supply with salt, flour, vegetables, fruits, and some of the articles manufactured in this province, and receive hides, cattle and other live-stock, cheese, jerked beef, and tal-

low. This province has numerous tanneries, and much coarse cotton-cloth is made.

Barquisimeto, the capital, has recovered from the effects of the earthquake and war [Barquisimeto, vol. iii., p. 492], and has again a population of 12,000 individuals. Tocuyo is situated in an elevated valley in that part of the province which is best adapted for the cultivation of wheat: it is well built. The inhabitants, consisting of about 10,000 individuals, are enterprising and industrious: they make cotton and woollen stuffs, and tan leather, of which they make boots, shoes, and leathern girdles, which go to the plains. Great quantities of salt from Coro are sent to Barínas and its neighbourhood. In this town are a college and some elementary schools. Carora, which has 4000 inhabitants, is situated in the dry portion of the province, and has some manufactures of cotton stuffs, and several tanneries. San Felipe, in the wet region of the country, is well built: the population is stated to be 7000. In its neighbourhood are the copper-mines of Aroa.

4. *The Province of Trujillo* lies between Barquisimeto and Merida, and extends over both declivities of the Andes from the Páramo de Rosas to the vicinity of Merida, but the greater portion of it lies on the north-west descent of the range, the drainage of which runs to the lake of Maracaibo. The most elevated part is occupied by several Páramos, but on their declivities are fine well-wooded valleys, and between them several plains descending in gentle slopes, covered with fine pasture-grounds. The lowest portion of the province lies within the Tierras Calidas, and in this tract the valleys are wider and of great fertility. The principal articles of agriculture are cacao, coffee, indigo, sugar, wheat, barley, cotton, maize, plantains, potatoes, yucca, and several kinds of leguminous plants. The commercial products (cacao, coffee, conserves, and sugar) are sent to Maracaibo by way of Zulia.

Trujillo, the capital, is built on a slope between two ranges of high mountains, and is 2744 feet above the sea-level. In its vicinity much wheat is grown. Many worsted stuffs are made in this town, and also conserves and cheese. There are a college and several elementary schools. The population is 4000. The great road from Carácas and Barquisimeto to Merida and New Granada traverses this place.

5. *The Province of Merida* comprehends the remainder of the Andes, extending to the boundary of New Granada, on both declivities of the range. Within its territories is the Sierra Nevada de Merida, the only summit of the Andes within Venezuela which rises above the snow-line. In soil and productions it resembles Trujillo. In some parts tobacco is cultivated on an extensive scale. Its commercial products, cacao, coffee, sugar, indigo, and cotton, go to Maracaibo by way of Zulia. Corn and flour are sent to Barínas and Apure. It has some commerce with Cúcuta in New Granada.

Merida, the capital, is built on a plain, or rather table-land, 10 miles long and 3 miles wide, which on one side joins the range of mountains, and on the other sides is encompassed by deep valleys. It is 5518 feet above the sea-level, and on the south of the town is the Sierra Nevada. The coffee grown in the vicinity is of excellent quality. Several kinds of woollen and cotton stuffs are made, and some are said to be equal to those of Europe, especially the carpets. There is a seminary for the education of priests, a college, and several schools: the population is 6000. The small town of Grita, also situated within the range of the Andes, stands on a small table-land not far from the boundary-line of New Granada. It is tolerably well built, and is traversed by the road leading from Merida to Pamplona in New Granada.

6. *The Province of Barínas* (Varínas) extends along the south-eastern base of the Andes, in all their extent from the banks of the river Cogedes on the north to the Uribante and Sarare on the south, and occupies the whole country between the rivers Apure and Portuguesa. The lower part of the declivity of the Andes is included within its territories; but this tract is nearly uninhabited, with the exception of a few narrow valleys. At the base of the mountains begins the sloping plain which descends to the south-east, and is known by the name of the Plains of Barínas. At the base of the mountains it is from 600 to 800 feet above the sea-level, but near the confluence of the Apure and Portuguesa probably less than 300 feet. The soil is very fertile, and either adapted to cultivation or to pasture; and its productions are so various, that the list comprehends nearly all the objects cultivated in Venezuela in the Tierras Calidas. The commerce of this province with the adjacent countries is very considerable, and all its products find there a ready sale, as its fruits, [illegible] and leguminous vegetables are in great demand in Trujillo and Merida, its live-stock, hides, and cheese in Barquisimeto, and all kinds of grain and leguminous vegetables in Apure. The articles of foreign commerce are—hides, coffee, cacao, cotton, and sugar, but chiefly tobacco: they are sent to Angostura by the numerous navigable rivers which drain the plains. It has also some commerce with Puerto Cabello and Carácas, to which places it sends [illegible] cacao, asses, pigs, and cattle.

Most of the towns of this province are built near the base of the Andes. The capital is Varinas. The towns of Guanare, Ospinos, and Araure, north of Varinas, and Pedraza, south of it, contain respectively a population between 2000 and 4000 persons. Nutrias is in the middle of the plains, not far from the banks of the Apure, and the depôt of the agricultural produce of the neighbourhood, especially the cattle.

7. *The Province of Carabobo* has taken its name from the place where the battle was fought by which the independence of the northern countries of South America [illegible] established. This province extends from the shores of the Caribbean Sea southward across the coast-range to the banks of the Rio Portuguesa, and comprehends two mountain-ridges, the greatest part of the Vales of Aragua enclosed by them, and the table-lands which lie south of the southern ridge of the coast-range. Along the sea it extends from Punta Aroa on the east to the banks of the Rio Yaracui, which divides it from Coro, and falls into the innermost angle of the Golfo Triste. It comprehends the best cultivated and most populous portion of the republic, the Vales of Aragua, where wheat grows by the side of plantains and the sugar-cane. Its products are as various as those of any other portion of the republic which does not rise above the temperate zone. It produces annually great quantities of coffee, cacao, indigo, tobacco, sugar, and cotton, most of which articles go to its port, Puerto Cabello, whence they are exported to the West Indies, North America, and Europe.

Valencia, the capital of this province, stands on a slope near the opening of a valley which extends between two offsets of the north ridge of the coast-range, about six miles from the west bank of the lake of Valencia. Its position is important for commerce, as all the products of the provinces of Barínas and Barquisimeto pass through this town to Puerto-Cabello. It has some good institutions for education, as a college, a grammar-school, and several elementary schools. The town is well built and contains 16,000 inhabitants. The best harbour of the republic, Puerto Cabello, belongs to this province. The harbour of Ocumare, east of Puerto Cabello, is good for small vessels. The town of Nirgua is built on a small plain [illegible] feet above the sea-level, and enclosed by mountains; it has 3000 inhabitants. In that tract of elevated ground between the southern ridge of the coast-range and the Galera de San Carlos is the town of Pao, which derives some importance from being built on one of the most frequented roads from the cattle-plains to the Vales of Aragua and to Puerto Cabello.

8. *The Province of Carácas* has an area of 33,948 square miles, which exceeds the extent of South Carolina in North America, and nearly by one-third that of Scotland or Ireland. It extends along the coast between Punta Aroa on the west and the mouth of the Rio Unare, and hence it stretches southward to the banks of the rivers Portuguesa, Apure, and Orinoco. Its eastern boundary is marked by the course of the Rio Suata, an affluent of the Orinoco and that of the Rio Unare. Within its limits are the eastern portions of both ridges of the coast-range, the eastern part of the Vales of Aragua, the valley of the river Tui, and a large part of the table-lands and low plains extending from the coast-range to the Rio Orinoco. The soil is only good in the Vales of Aragua and the valley of the Tui: the remainder is of indifferent fertility. It produces all the articles which grow in the hot zone, and a few which belong to the temperate zone, as wheat, which grows in a few places. The articles cultivated for exportation are coffee, cacao, sugar, tobacco, and in some places indigo, tobacco, and cotton.

Carácas, the capital, contains, according to the latest

unt, about 35,000 inhabitants. [Caracas.] The har-
r of Carácas is La Guaira, or Guayra, which is distant
i it in a straight line only six miles, but by the road
the mountains about 13 miles. It is built on a nar-
and uneven plain between two huge masses of rock,
at the back of the town the mountains rise almost
endicularly. The town is rather well built and con-
6000 inhabitants. But it has only an open roadstead,
hich the vessels are exposed to the winds and the
of the sea, and the anchoring-ground is not good.
climate is exceedingly hot, and it is considered very
ealthy, but without reason. South-east of Cape Codera
e small harbour of Higuerote. In the Vales of Aragua
three considerable places, La Victoria, Turmero, and
acai, each of which contains a population of between
) and 8000 individuals. La Victoria is advantageously
ted for the commerce with the great plains; for to the
h of the town the southern ridge of the coast-range
ents a great depression, through which the road leads
he town of Cura, which is built at the southern opening
he depression. In the southern plains is the town of
bozo, a thriving place.

The Province of Barcelona lies east of Carácas, from
h it is divided by the rivers Suata and Unare, and ex-
from the shores of the Caribbean Sea to the banks of
Orinoco. Along the coast it occupies the tract be-
n the mouth of the Unare and Punta Conoma, which
pposite the islands Arapos, and along the Orinoco the
try between the mouth of the Suata and the Rio de los
s. The interior of the country is occupied by arid
e-lands, especially the Mesa de Guanipa, and their
ngations extend southward to the vicinity of the banks
e Orinoco. The tracts between these offsets are fit
ultivation; the Mesas themselves can only be used as
ure-ground for some months in the year. The low
north of the Mesas is a grassy savanna, which is
only fit for pasture. Most of the productions of the
d zone are cultivated, but not to any great extent.
cacao, coffee, cotton, tobacco, and cocoa-nuts are
wn for exportation.

arcelona, the capital, has at present only 6000 inhabit-
, as the produce of the cattle-plains, which was for-
y brought to this town, now goes to Angostura.
RCELONA.] In the interior is the town of Aragua,
h derives some importance from the circumstance that
ly all the roads across the table-lands unite at this place.

The Province of Cumaná occupies the north-east
ion of the republic, and extends southward to the
oco, whose course makes its boundary to the point
e the river begins to divide into different arms. From
place the line follows the course of that branch of the
which is called Mamo, and which falls into the Gulf
aria under the name of Boca Vagre. Nearly the
e of the Bergantin Mountains lie within its terri-
s, the high Mesa de Urica and some lower ones, and
the fine tract of country which forms the slope from
base of the table-lands to the shores of the Gulf of
a. All tropical products are cultivated, but though
e parts of the interior rise to nearly 2000 feet, the pro-
tions of the temperate zone do not succeed; wheat at
t is not grown. To a soil fertile in most parts this pro-
ce unites the advantage of an extensive coast-line, and
the neighbourhood of foreign settlements; and it is im-
ving rapidly. Its articles of commerce are exported
n five ports, Cumaná, Carúpano, Güiria, Rio Caribe,
Maturin.

umaná has only 8000 inhabitants. [Cumana.] Carú-
o is on a small island in a small bay on the north coast
the peninsula of Araya: it has some commerce with
nada and Barbadoes. The population is under 2000.
ria and Rio Caribe, two small ports situated in the
t western recess of the Gulf of Paria, export their pro-
e to Trinidad. Maturin is a considerable place on the
ks of the Rio Guarapiche, which falls into the Gulf of
ia. The river is navigable at the town for barges,
for larger vessels at the Caño Colorado, about 27
es lower down in a straight line. Being surrounded
h a country well adapted for pasture, the town exports
Trinidad a great number of cattle, horses, and mules.

11. *The Province of Guayana*, the largest of the republic,
nprehends the whole country south and east of the
noco, and, of the territories west of that river, all the
ricts south of the Rio Meta. The countries drained by the Casiquiare and Rio Negro and their affluents are also included in this province, as well as the whole delta of the Orinoco. Though all the tropical products are cultivated in most places with success, it contributes little to commerce, as the agricultural establishments of the whites are limited to a few tracts on the Orinoco and to the table-land of Upata. For though the aboriginal tribes cultivate some plants, they grow only what is required for their own consumption, and these tribes are in possession of nearly the whole country. All the commerce of this province is concentrated in the town of Guayana, or Angostura [Angostura], the population of which is stated not to exceed 4000. Upata is a small town on the table-land of the same name.

12. *The Province of Apure* derives its name from the river which runs along its northern boundary, and extends southward to the banks of the Rio Meta. A very small portion of this province is fit for cultivation: maize, rice, and some leguminous plants and roots are grown: but as the pastures are abundant all the year, a great number of cattle, horses, mules, and asses feed on the plains; and the animals are exported in considerable numbers to all the neighbouring countries, especially to Angostura. The capital is Achaguas, which has a population of about 2000. San Fernando de Apure is somewhat smaller, and has some commerce with Barinas and with Angostura.

13. *The Island of Margarita* constitutes one of the provinces of the republic. It is in the Caribbean Sea, opposite the peninsula of Araya, between 10° 50′ and 11° 10′ N. lat. and 63° 50′ and 64° 30′ W. long. It is somewhat more than 40 miles long from west to east, and nearly 20 miles wide in the widest part. This island consists of two large masses of rock, and a narrow isthmus which unites them. The eastern mass is called Cerro de Copei, and its summit is 3240 feet above the sea-level; the summit of the western mass, Cerro del Macanao, is 4573 feet high. The isthmus which unites these masses is nearly ten miles long, and in the narrowest place only 60 yards wide, but generally 180 yards. In the lowest part it is only between three and four yards above the sea-level, but there occur some small sand-hills on it. From the eastern mass of rocks a narrow tongue of land runs parallel to the isthmus, and the lagune formed by them, called Laguna Arestinga, is ten miles long, but only two wide. It is shallow and salt. The eastern mountain-mass is very much broken, and contains several summits, and between them small valleys. In these valleys and only on some of the slopes cultivable tracts are found. The western mountain is a nearly unbroken mass of rock, which supplies scanty pasture for a few goats. On this island coffee, sugar, maize, yucca, plantains, cocoa-nut palms, other fruits, and several kinds of roots and leguminous plants are grown, and a little cacao; but hardly any of these products supply articles of commerce: the exports consist of turtles, fowl, fish, and salt.

Asuncion, the capital, is built in a narrow valley, which is well cultivated. It contains about 3000 inhabitants. The port is Pampatar, which is about six miles from it on the south-eastern shore of the eastern peninsula. On the northern shore, not far from the place where the isthmus begins, is the small harbour of Juan Griego.

The following table, taken from Codazzi, shows the extent and the absolute and relative population of the provinces, and the number of slaves. The calculation was made on computations of the years 1837 and 1838.

Provinces.	Area in square miles.	Number of Inhabitants.	Number of Inhab. to a square mile.	Number of Slaves.
Caracas .	34,104	242,888	7·1	34,420
Carabobo .	8,148	96,967	11·9	4,054
Barquisimeto	9,384	112,755	12·0	2,321
Coro . .	11,392	40,476	3·5	1,465
Maracaibo .	33,360	42,832	1·3	565
Trujillo .	4,344	44.788	10·3	1,371
Mérida .	10,884	62,116	5·7	698
Barinas .	23,928	109,497	4·6	1,458
Apure . .	22,320	15,479	0·7	158
Barcelona .	13,380	52,103	3·8	941
Cumaná .	17,556	50,671	2·9	1,481
Margarita .	444	18,305	41·2	233
Guayana .	218,788	56,471	0·25	608
	408,032	945,348	2·3	49,782

the seat of the antient government, and contains the halls of the various councils of the administration. The hall of the Senate, or Pregadi, is still in the same state in which it was before the fall of Venice; that of the Council of Ten has been made into a gallery of paintings. The vast hall in which the Great Council used to assemble is now the repository of the library of St. Mark. All these apartments are adorned with numerous paintings by Titian, Tintoretto, Paul Veronese, and other masters of the Venetian school, which commemorate the great events in the history of the republic. The series of the portraits of the doges has two omissions in it: that of Marino Faliero, whose place is filled up by the inscription, on a black ground, 'Hic est locus Marini Falieri, decapitati pro criminibus;' the other is that of the last doge, Manin, who survived the fall of the republic. The library of St. Mark contains 65,000 volumes, and about 5000 MSS. Petrarch gave some MSS. to Venice, though not his own library, as has been said; but Cardinal Bessarion was the principal contributor to the library of St. Mark. The French traveller Valéry visited the 'piombi,' or state prisons of Venice, in the attics of the ducal palace, which had been already described by Casanova, who was for some time an inmate of them, and which he says are not worse than most prisons are, and also the 'pozzi,' or dungeons, which had been once used as state prisons in the middle ages. The pozzi are on the ground-floor of the ducal palace, and not under the neighbouring canal, as it has been stated. They are damp and dismal; but Valéry observes that in our own times some of Napoleon's state prisons, especially that of the Castle of Joux in the Jura mountains, in which the negro Toussaint l'Ouverture died, and where the Marquis de Rivière was long imprisoned, were no better than the famous 'pozzi' of old Venice. (*Voyages Littéraires en Italie*, b. vi., ch. 6.)

The piazzetta, or lesser square of St. Mark, which is open on one side to the sea, has two handsome pillars of granite brought from Greece in the twelfth century. Upon one is the winged lion, of brass, the antient emblem of the republic, known by the name of the Lion of St. Mark, and upon the other is a statue of St. Theodore, a patron saint of the republic.

Among the many remarkable churches of Venice, besides St. Mark, for whose description we must refer to the guide-books, the following deserve especial mention:—1, S. Giorgio Maggiore, constructed by Palladio [PALLADIO, ANDREA]. It has the sepulchral monument of the Doge Domenico Michieli, the conqueror of Jaffa, Tyre, and Ascalon, he who afterwards, being attacked by the Byzantines, sailed with his fleet through the Archipelago and ravaged many of the islands, so as to deserve the title of 'Terror Græcorum,' which is on his epitaph. 2, Il Redentore, also by Palladio, one of the handsomest churches in Venice, situated on the island of La Giudecca, is, like most other Venetian churches, rich in paintings. 3, S. Giovanni e Paolo, the Westminster Abbey of Venice, has numerous and splendid monuments of doges, senators, commanders, and other illustrious men. Those of three doges of the Mocenigo family; of the Doge Vendramini, a 'new man,' made a patrician in consequence of his services in the war of Chioggia; of Alvise Michieli, who died in 1589, whilst speaking in the senate; of Nicola Orsini, count of Petigliano, captain-general of the army of the republic; of the gallant and unfortunate Bragadino, the defender of Famagosta, who was barbarously put to death by the Turks; and of the Admiral Carlo Zeno, the saviour of Venice from the Genoese, are most deserving of notice. The church is also adorned with paintings, some of which are historical. On the square by the side of the church is the monument of Bartolomeo Colleoni of Bergamo, a celebrated general of the middle ages, with his equestrian statue. A bust of Titian above the door of the vestry-room is the only monument to the memory of that great master. 4, I Frari, a splendid church with numerous monuments, among others that of Canova raised by subscription, and several good paintings. In the suppressed convent of the Frari are deposited the archives of the old republic, which were taken to Paris and have been since restored. Many of these documents, which had been closed to the public before, were used by Daru for the compilation of his 'History of Venice.' They fill a great many rooms of the convent. Those belonging to the Council of Ten were partly destroyed by a fire in 1509; and of those of the State Inquisitors only fragments remain, a part hav been destroyed by themselves from state policy, and t rest being dispersed or mislaid at the fall of the repu Daru has been led into error by some pretended i tutes of the State Inquisition of Venice, which he foun the National Library at Paris, and which are now ge rally considered apocryphal. (Valéry, *Voyages en It* vi. 4.) Valéry saw in the archives a copy of the stat description of the Venetian states, compiled by orde the senate, 'Anagrafe dello Stato della Repubblica, w was printed but not published in 1770, in 5 vols. fol., o seven copies being worked off for the use of the gov ment. He was also shown the autographs of the con tions of Fra Paolo Sarpi, theologian of the republic i controversies with the court of Rome, and the corresp ence of Villetard, French secretary of legation at Ve at the fall of the republic, who was instrumental in e ing the revolution, thinking all the time that he was t ing to restore Venice to its original independence, he was undeceived by Bonaparte's famous letter, in w he told him that the Venetians were not fit for liber

The banks of the Canal Grande are lined with marble mansions of the nobility, whose historical names have in many instances outlived the fa their former possessors. Some of them are used as gov ment offices, others are let to foreign consuls or to strangers. Some, such as the palaces Giustiniani, Pe Barbarigo, Grimani, Michieli, Contarini, Ven Manfrini, still possess valuable paintings and sc tures, especially the last named, which has a rich g lery, containing among others the painting of the th portraits by Giorgione, which Byron in his 'Beppo' ha highly extolled. Count Cicognara, assisted by other m bers of the Academy of the Fine Arts, has publis splendid work, 'Le Fabbriche più cospicue di Ve which will perpetuate the memory of the great stru of that city when most of them shall have crumbled dust. Another Venetian, Cicogna, has published inscriptions of Venice, 'Le Inscrizioni Veneziane e illustrate,' 3 vols. 4to., Venice, 1824. Lastly, a Vene lady, Michieli, has collected the memorials and tradi of the old festivals, ceremonies, and pageants of the Ve tians, from the oldest times of their history, and has gi a very interesting account of them—'Origine delle Fe Veneziane,' 6 vols. 12mo., Milan, 1829. The Academy the Fine Arts, of which the patriotic Cicognara was originator, has been the means of saving many ma pieces of the Venetian school, which otherwise would been lost to Venice. Many of them belonged to the pressed monasteries: others were restored from Pa 1815; some, such as the famous Assumption by Ti were discovered in a corner of a church, where they forgotten, covered with dust and filth. A painting Gentile Bellini represents a procession passing through square of St. Mark in the fifteenth century, with the tumes and localities of that age. The Slave ema by St. Mark is a master-piece of Tintoretto. The aca has altogether about 400 paintings, besides models of Elgin and Ægina marbles, a model of the statue Theseus conquering the Centaur, by Canova, which a Volksgarten at Vienna, and a collection of original dr ings of Leonardo da Vinci, Michel Angelo, and Raphael.

The Arsenal or dockyard of Venice, begun in 13 brated in the verse of Dante (*Inferno*, canto 21), long main instrument of the power of the republic, remai sad monument of its former greatness and present de Formerly it employed 16,000 workmen, a number wh was reduced in the last century to 1500; it employs about 1000 workmen, of whom one-half are convicts. arsenal is situated at the eastern extremity of the town surrounded by a high wall, and occupies an area of three miles in circumference. When the Abbé Richard it (1761-2), there were about forty ships of war, of which twelve were three-deckers, in the docks ready for sea, i dependent of the fleet stationed in the Adriatic and Corfu; arms for 150,000 men, 2500 pieces of brass ordnance besides 1500 iron cannon, and vast stores of biscuit, sa meat, and other provisions for sea; cables, sails, timber ship-building, brought from the forests of Istria and Dalm tia, and all other appurtenances to such an establishment.

The arsenal of Venice is now the dockyard for the Austrian navy, which consists of three ships-of-the-line ordinary, eight frigates, and about twelve armed brigs mers. The expense of the navy is about 3,200,000 s annually. A naval college with thirty boarders is lished at Venice. A body of artillery 350 strong, and talion of marine infantry 1200 strong, are attached to ervice of the navy. The arsenal contains a number cks and basins, foundries for cannon, forges, a rope- above 1000 feet long, a vast timber-yard, and an ury with arms for 10,000 or 12,000 men. The armour enri IV. of France, given by him to his ally Venice, mpanied by a letter which he wrote to the senate, is rved in the arsenal; but his sword which he wore at disappeared in 1797. (Valéry, *Voyages en Italie.*) e is also a monument in relief to the memory of lo Emo, great admiral of Venice, who died in 1792, was the last who caused the Venetian flag to be ected in the Mediterranean. Emo, unlike many other cians of latter times, was a real patriot. When a n dispersed his fleet and sunk several of his ships in Ægean Sea, he wrote to the senate offering his private erty 'to repair part of the loss which the republic had ained.' This monument to Emo was one of the first s of Canova. The artist had made no bargain as to emuneration; but the senate, after the completion of work, settled upon him an annual pension of 100 ts for life, besides giving him a gold medal of 100 ins value. The pension was suspended at the fall he republic, but was afterwards continued by the rian government. At the land entrance of the nal, which is a gate adorned with several statues, are marble lions, brought from Athens by Morosini in the r part of the seventeenth century.

enice has several theatres; that of La Fenice is one of argest in Italy. The Venetians are as fond of music as : and the songs in their dialect, set to music by native posers, are very pretty. The Carnival at Venice is still long; but masks are not used now except by the r orders. The people are naturally lively and light-rted: their festivals and public rejoicings, however y, are unattended by quarrels or disorderly conduct. educated classes have a social affability and ease of ners which are very fascinating.

enice has a gymnasium, a lyceum for scientific instruc-, a patriarchal seminary for clerical students, two col-s for female education under the direction of nuns, an næum of Sciences and Literature, and the Academy of Fine Arts already mentioned. Besides the library of Mark or Marciana, there are libraries belonging to the rent colleges and academies, as well as to several ents and palaces of the nobility. The printing-press enice, though not so flourishing as it was in the time he Aldi, is still active, especially the printing establishment of Alvisopoli, which has published many useful works of late years.

The charitable institutions are numerous, but not more so than what is absolutely required by the decayed condition of Venice. When the French evacuated the town in 1814, nearly one-half of the population was in want of charitable assistance. The misery was frightful. The violent subversion of the old government, the anarchy which followed the transition from the condition of the head of a powerful state to that of a mere provincial town, the loss of private property in consequence of the revolutions in Europe, the consequent ruin of most of the patrician families, many of which depended upon their official employment and emoluments—all this was followed by Napoleon's Continental System, which annihilated the maritime trade of Venice. Napoleon, in a visit which he made to Venice in 1807, gave orders for the relief of the suffering population, but they proved insufficient; and some of them, dictated in his usual hurry, were never executed. The Austrian administration since the restoration has applied gradually, but effectually, to alleviate the distress of Venice. Pecuniary assistance from the treasury of the kingdom, a better administration of the communal revenue, a great diminution of local taxation, the establishment of a free port, and important public works undertaken at the expense of the government, have in great measure answered the intended purpose. Fifty-three millions of livres have been spent since the restoration by the treasury of the Austrian administration of the Lombardo-Venetian kingdom for the relief of the city of Venice. (*Semplice Verità opposta alle Menzogne di Enrico Misley*, Paris, 1834.) The mercantile shipping of Venice has assumed a new activity; it now trades all over the Mediterranean. Venice with Chioggia have about 126 large merchant-vessels and above 700 coasting-vessels. The number of vessels which enter the port of Venice yearly is between 1200 and 1300, including small craft. (Serristori, *Statistica*; Quadri, *Prospetto Statistico.*)

Venice is necessarily a decayed city, and no change of government could restore it to its former prosperity. The continental provinces may have improved since the fall of the republic, and may improve still more, but Venice itself has sustained a loss which is irreparable. Its decay was for a time gradual; it resulted from many causes, one of which was the stream of commerce running into other channels. But the final blow was given by Bonaparte, with whose name the history of the catastrophe of Venice will remain for ever associated. 'Venice,' observes Valéry, 'began with Attila and it ended with Bonaparte; the terror of two conquerors produced its origin and its fall.'

Table of Principal Buildings.

	Date.	Architect.	Remarks.
Marco, or Duomo . .	976	Artists from Constantinople	Style Byzantine. Grotesque in design, but rich in materials and details. Numerous domes of uncouth form.
mpanile	Begun 1148	B. Buono, finished	A square tower, 320 feet high. The loggia on one side below, by Sansovino.
urch, S. Giovanni e Paolo.	1246—1430	Niccolo da Pisa ?	The oldest and largest church after St. Mark's: 300 feet in length; a great many splendid monuments.
ita Maria de' Frari . .	13th century.	. . .	Tedesco-Gotico, or Pointed style.
azzo Ducale . . .	14th century.	Calendario, &c.	A singular structure, of Saracenic character.
donna del Orto . .	1350	. . .	The façade an interesting example of Tedesco-Gotico. Campanile, 175 feet high.
d' Oro	13th century.	Unknown	Façade never completed, but what is executed is extraordinarily rich and picturesque.
enal	1304	Pisano, Andr.	The portal by Pisano, 1460.
azzo Pisani . . .	About 1400	Unknown	This and the Foscari the two finest specimens of their class of this period.
azzo Foscari . . .	About 1400	Unknown	
azzo Vendramini-Calergi .	1484	Lombardo, Pietro	A fine specimen of the cinquecento or mixed style.
lazzo Cornari, presso Teatro S. Angelo.	..	. . .	Of same character as preceding, but less elegant; arrangement of windows in basement singular.
a Zaccaria . . .	1457	Lombardo, Martino	Façade lofty and rich, in a mixed style of Lombardic and cinque-cento.

	Date.	Architect.	Remarks.
Scuola di S. Marco . .	1485	Lombardo, Martino	Exceedingly rich and picturesque.
Palazzo Contarini à S. Luca .	..	Lombardo?	Admired for beauty of execution.
Capella Emiliana, S. Michele di Murano.	1530	Bergamasco, Gugl.	An hexagonal plan, with circular Internal diameter 28 feet.
Procuratie Vecchie . .	1500	B. Buono	North side of Piazza di S. Marco. tiers of arcades; the two uppermost two arches over each of those in
San Salvatore . . .	1500—1534	Lombardo, Tullio; Sansovino, Scamozzi.	A large church, on plan of a cross, or with three transepts.
Palazzo Trevisano . .	1530	Bergamasco, Gugl.	A lofty and extensive façade.
Scuola di S. Rocco . .	Begun 1517	B. Buono, and Sante Lombardo.	A picturesque example in a mixed
Palazzo Contarini à S. Samuele	About 1504	Lombardo?	
Palazzo de' Camerlinghi .	1525	Bergamasco	Very rich architecture.
Castel S. Andrea al Lido .	1541—1571	Sanmicheli	A fine specimen of rusticated style, very rich Doric entablature.
Palazzo Grimani à San Luca .	..	Sanmicheli	Now the Post-office. A noble three orders, all Corinthian one with fluted pilasters, and sub-order.
Palazzo Grimani à S. Maria Formosa.	..	Sanmicheli?	
Palazzo Cornaro à S. Polo .	..	Sanmicheli	Basement bold and good; upper gre in style, and cut up by windows.
Palazzo Manin . . .	..	Sansovino	Restored by Selva, eighteenth Three orders.
Palazzo Cornaro à S. Maurizio	1533	Sansovino	Two orders; Ionic and Corinthian columns, on a noble rusticated
San Francesco della Vigna .	1534	Sansovino	The façade by Palladio, and, like Giorgio and Redentore, with a order, flanked by a smaller one pediments.
Zecca, or Mint . . .	1535	Sansovino	
Biblioteca Vecchia . .	1536	Sansovino, fin. by Scamozzi	Remarkably rich in details.
S. Giorgio de' Greci . .	1532	Sansovino	The first order, or lower part of good, but the rest heavy.
Fabbriche Nuove di Rialto .	1555	Sansovino	Two orders, Doric and Ionic, above cated arcade of 25 arches.
La Carità	1561	Palladio	A much-admired work of chiefly remarkable for the ter. Converted into Academy Pinacoteca, 1827. Interior and improved by Lazzari.
Il Redentore . . .	1576	Palladio	Façade Composite, with a lesser order. Fine interior.
S. Giorgio Maggiore . .	1556—1579	Palladio	Façade Composite, with a lesser order. Fine interior.
Procuratie Nuove . .	1584	Scamozzi, &c.	South side of St. Mark's Piazza.
Publiche Prigioni . .	1589	Da Ponte	A Doric order, with a single row dows, on a rusticated basement.
The Rialto	1589—1591	Da Ponte	A single arch, 98 feet span.
Palazzo Balbi . . .	1582	Vittoria, A.	
S. Nicolo de' Tolentini . .	1595	Scamozzi	The portico (Corinthian, hexastyle style) added by Andrea Tirali, century.
Palazzo Bataggia . . .	..	Longhena, Bald.	Singular façade.
Santa Maria della Salute .	1630	Longhena, Bald.	A magnificent octagonal mass, with large cupola, but with much in
Palazzo Pesaro . . .	..	Longhena	A very stately façade; rich and lofty basement, and two orders, Composite.
Palazzo Rezzonico . .	..	Longhena	Of similar character.
La Dogana, Custom-house .	1682	Bennoni, Gius.	
San Eustachio, or S. Stae. .	1709	. . .	Façade added by D. Rossi.
SS. Simeone e Giuda . .	1718	Scalfarotto, Giov.	A very large dome. A prostyle portico, four columns, the end coupled with pilaster piers.
Palazzo Corner della Regina .	1724	Rossi, D.	A rich façade, in style of that of Pesaro.
Church of the Jesuits . .	1728	Rossi, D.	
La Maddalena . . .	..	Temanza, T.	Exterior poor and tame. Interior a with low coffered dome, 50 feet in meter.
San Toma	1742	Bognolo, Fr.	
Teatro Fenice . . .	1789	Selva, Giannantonio	Burnt 1835, since rebuilt.
Public Gardens, Buildings, &c.	1810	Selva, G.	
Fabbrica Nuova . . .	1814	Soli, Giuseppe	A handsome line of building, west end of St. Mark's Piazza, nuation of the Procuratie Nuove.

ong the islands in the neighbourhood of Venice the ing deserve notice:—1, Murano, about a mile to the of Venice, is a town of about 6000 inhabitants, and nanufactories of glass and plate-glass, which were of greater importance than they are now; and also ck pearls and beads called 'conterie,' which are ex- d in considerable quantities. The remains of Fra Sarpi were transferred from the church of the Ser- here they lay forgotten, to that of S. Michele in no, a few years ago, and a marble tomb with an in- ion was raised to him at the expense of the com- ty of Venice. Morelli, the late learned librarian of ark, is buried in the same church, which is remark- for its ornaments. The church of S. Donato, called mo di Murano, is of Byzantine architecture of the th century, with mosaics and columns of Greek le. The church of St. Peter and Paul is rich with ings. 2, Torcello, farther distant to the north-east, markable for its antient and splendid church, built 1008, by the bishop Orseolo, and is covered with ics, and adorned with marble, a testimonial of the th of Venice in that remote age. The neighbouring h of Santa Fosca, of the ninth century, is built with ins of structures of the Roman times. These islands peopled by the fugitive inhabitants of the neigh- ng towns of Altinum and Julia Concordia, on the land, which were devastated by the northern barba- . Martial (iv. 35) speaks of the shores of Altinum as ling in his time those of Baiæ in attractions. 3, Bu- has manufacturies of lace and straw-hats. 4, Sant' a, with a church dedicated to the mother of Con- ine, whose remains were carried thither from Constan- le in the twelfth century. 5, Lazzaretto Nuovo and hio with the quarantine establishment. 6, Malamocco, esidence of the doges in the early ages of the republic: es its name to the port of Malamocco, one of the prin- l entrances from the sea into the lagoons. 7, S. ro, an island south of Venice, with a celebrated mo- ery of Armenian monks, who are not schismatic, like t of their countrymen, but are in communion with ne and acknowledge the pope. They have a library of 00 volumes and about 400 MSS., mostly in the Arme- language, a printing-press for works in the same lan- ge, and a college for clerical students. [ARMENIA.] Andrea del Lido, with a fortress, which is considered sterwork of the architect and engineer San Micheli, which commands the entrance into the lagoons on side. 9, Palestrina, a small town south of Mala- co, on the Littorale, or natural dyke of the lagoons. r it are the 'Murazzi,' or breakwater, made of large ks of marble laid on piles driven into the sand: it s ten feet above high-water. 10, Chioggia, a well- t town, and a bishop's see, situated at the southern ance of the lagoons, has a good harbour, a fine cathe- , a theatre, and about 16,000 inhabitants. The saline, alt-pans, in the neighbourhood are very productive. To south of Chioggia is the port of Brondolo, at the uth of the Adige.

The metropolitan province of Venice, formerly called Il gado, reckons 249,000 inhabitants. (Serristori, *Statis- a.*) It comprises, besides the islands in the Lagoons, a g strip on the mainland from the æstuary of the Po to at of the Tagliamento, with the small towns of Ariano, reo, Dolo, Fusina, Mestre, San Donà, and Porto Gruaro. e fine country-seats along the banks of the Brenta on e road to Padua are in this province. [BRENTA.] Of e whole of the dioceses in the old Venetian states the chbishop of Venice, who is styled patriarch, is metro- litan.

Topographical descriptions of the Lagoons are given by ernardo Trevisano, 'Della Laguna di Venezia,' 1715 and 18; Cristoforo Tentori, 'Della Legislazione sulla pre- rvazione della Laguna,' with a map, 1792; Bernardo endrini, 'Memorie Storiche sullo Stato antico e moderno elle Lagune,' 1811, and 'Le Isole della Laguna di Venezia appresentate e descritte,' in quarto, Venice, 1829, and lio.

For descriptions of the city of Venice we must refer to he numerous guide-books and tourists. Venetian litera- ure has been treated by Marco Foscarini, in his elaborate ork 'Della Letteratura Veneziana,' which however death prevented the author from completing. Moschini has published a history of Venetian literature in the eighteenth century, 'Della Letteratura Veneziana dal Secolo xviii. fino ai nostri Giorni,' 4 vols. 4to., Venice, 1806-8.

VENICE, REPUBLIC OF (LA SERENISSIMA REPUBBLICA DI VENEZIA), a state politically extinct within our own times, but which figured for more than a thousand years among the independent states of Europe, and acted a considerable part in modern history. It is proper therefore to give a brief sketch of its territory, institutions, and political vicissitudes.

The continental territory of Venice in Italy was much more extensive than what is now called the Venetian States, 'Stati Veneti,' which constitute part of the Lombardo-Venetian kingdom. It included the three provinces of Brescia, Bergamo, and Crema, called 'Oltre Mincio,' 'beyond the Mincio' with respect to Venice, which formed about one-third of the whole Venetian terra firma, besides the peninsula of Istria, which, although beyond the geographical limits of Italy, was also included within the denomination of terra firma, or continental territory of Venice. These provinces were detached from Venice by Bonaparte in 1797, when he annexed Bergamo, Brescia, and Crema to the Cisalpine or Italian republic, and gave the rest of the Venetian territories to Austria. In 1810, after having retaken the whole Venetian territory from Austria and united it to the new kingdom of Italy, he detached Istria from it, and joined it to Dalmatia and Croatia, to form the separate government of the Illyrian provinces. At the restoration of 1814 these administrative arrangements were maintained, and the division of the newly constituted Lombardo-Venetian kingdom under Austria, which retained the name Venetian States, was made to embrace only the old Venetian provinces; Brescia, Bergamo, and Crema remaining attached to the Lombard division. [LOMBARDO-VENETIAN KINGDOM.] Istria was made a part of the kingdom of Illyria, likewise subject to the crown of Austria.

Government of the Venetian Republic.—The Venetian government during the last five centuries of its existence was a close aristocracy, being entirely in the hands of a certain number of families. As in the other Italian republics of the middle ages, or in the town-cantons of Switzerland, the head town ruled over the subject provinces, because the commonwealth originated in the town and with the town; a very different origin from the democracies of the Swiss mountain-cantons, or those of the United States of America, in which the whole population participated in the declaration of independence and in the struggle that followed. But within the city of Venice itself, which was in fact the state, several changes took place in the course of ages in the constitution. Venice was in its origin a city of refuge: the first inhabitants were fugitive citizens of various towns of the neighbouring 'terra firma,' Aquileia, Opitergium or Oderzo, Concordia, Altino, and Padua, who, scared by the devastations of the Goths and other northern tribes in the early part of the fifth century of our æra, took refuge in various small islets and strips of land which rise just above high-water, in the midst of the lagoons or shallow seas that extend from the mouth of Adige to that of the Piave. The lagoons are separated from the open sea by a natural dyke or strip of land, called Lido, or Littorale, about 35 miles long, which extends from Brondolo on the south to the mouth of the river Piave on the north. This dyke is intersected by several cuts or channels, through which ships from the Adriatic reach Venice, and which are called ports. The principal are those of Chioggia, about 20 feet deep at high-water; Malamocco, which is about 17 feet; and S. Nicolò del Lido, which is about 10 feet deep. The lagoons cover an area of about 200 square miles: they are very shallow in most parts, but are intersected by deeper canals, which are kept open by art, and by which vessels reach the town.

The first emigrants assembled on the islands of the lagoons after the devastation of the Venetia by Alaric, A.D. 407-13. In 421 the first church, dedicated to S. Giacomo, was built on one of the most elevated of the islands, called Riva alta, afterwards Rialto. The emigrants increased in number and formed a community, which was administered by consuls sent from Padua, which was their metropolis. The names of some of those early magistrates have been preserved, and we find among them Faliero, Candiano, Fosco, and Dando, whose posterity became afterwards distinguished in the annals of Venice. When Attila destroyed Aquileia and other towns of the Venetia, A.D.

451-2, a second emigration took place to the lagoons, and this time it is said that many of the higher families of the country were of the number. Some of the Venetian historians insist not a little on their town being peopled from the beginning by men of the higher ranks of society; but Cassiodorus, who wrote about a half a century after the destruction of Aquileia, speaking of the Venetians, describes them as having no wealth bnt their boats, no food but fish, and no merchandise but salt, which they exchanged for other provisions.

The inhabitants of the Lagoons, being left to themselves, among the general anarchy and desolation which prevailed on the mainland of Italy, began to act as an independent community; for this purpose each of the principal islands elected a magistrate styled Tribune, who was renewed yearly. The number of these tribunes is said to have been twenty-four, and they met, on certain days, in council, to discuss and regulate public matters. In cases of importance however they convoked a 'concio,' or general assembly of the people, which decided by acclamation on the questions proposed by the tribunes. This is all that is known concerning that early form of government. The number of tribunes seems to have varied,—sometimes twelve, sometimes ten, sometimes seven, all however chosen annually by the people. They formed the executive, and are said by some to have been assisted by a council of forty persons, likewise chosen by the people, who performed also the functions of judges; but the institution of this council of forty is generally considered to be of a much later date. The government of the tribunes lasted about two centuries and a half, till A.D. 697. During this obscure period, we find that the Gothic kings of Italy, and afterwards the Eastern emperors, although they did not interfere in the local government of the inhabitants of the Lagoons, nor appoint rectors or judges over them, yet seem to have considered them as their subjects, and required at times their services. In one of his letters Cassiodorus, minister of king Theodoric, orders the Venetians to bring to Ravenna, in their vessels, the wheat, wine, and oil which the Istrians paid as tribute. It ought to be observed however that Cassiodorus addressed this letter to the 'Veneti Maritimi,' distinguishing them from the other 'Veneti' inhabitants of the mainland, to whom he addressed several other letters about affairs of finance and administration. This distinction, not having been noticed, may have led to erroneous inferences concerning the degree of dependence of the Venetians of the islands upon the rulers of Italy. When Belisarius was besieging Ravenna, where Vitiges was shut up, he requested the Venetians to assist him with their ships to blockade the mouths of the Po, by which the besieged might receive provisions. When Narses marched against Totila, the Venetians transported part of his troops through their lagoons to the mouths of the Po. It is reported that Narses on this occasion visited the new city of the lagoons, and made a vow to build two churches there, if he were successful in the war, which he afterwards fulfilled.

The Longobard invasion of North Italy occasioned fresh immigrations from the mainland of the Venetia to the islands of the Lagoons. The people of Opitergium, with their bishop Magnus, took shelter in an island at the mouth of the Piave, where they built a town or village, which was called Eraclea, from the name of the then reigning emperor Heraclius. Another band of fugitives settled upon another island, farther south, called Equilium. The bishop of Altinum repaired with his flock to the island of Torcello. Lastly, the bishop of Padua took refuge at Malamocco. All these islands and places assumed the plural name of Venetiæ, which has continued to be the Latinized name of the city. But at that time the population was scattered among islands distant from each other. Eraclea and Rialto seem to have been the two principal places. Many of the smaller islands, which afterwards formed part of the city of Venice, were not yet built upon. It appears that during this period of the tribunate, democracy did not work well among the Venetians: there were intrigues and turbulence at the annual elections; aspiring men headed their respective factions; and as population increased, and wealth was accumulated by commerce, the influence of the property of the few was felt among the many. Sanudo, in his 'Chronicle,' says that the tribunes were quarrelling among themselves about precedence. The republic was bordering on a state of civil war, and this too at a time when the attacks of foreign enemies rendered union and firmness of council most necessary. Sclavonian and Istrian pirates from the Adriatic were lurking about the lagoons, and plundered the vessels by night, whilst land robbers made incursions from the side of the mainland. The son of the Longobard duke of Friuli attacked the island of Eraclea. Fortunatus, schismatic bishop or patriarch of Aquileia, went with an armed party by night to assail the rival see of Grado, an island which, although far to the northward, seems to have been included, together with the other islands and lagoons all along the coast of the Venetia, under the jurisdiction of the republic,—and he plundered the church and episcopal residence. The general discontent produced by this state of insecurity induced the principal citizens and the clergy, with the patriarch of Grado at their head, to propose the appointment of a single chief-magistrate for life, which took place by acclamation in Eraclea, A.D. 697, in the person of [illegible] Anafesto, a citizen of Eraclea, who was saluted by the title of Doge, or Dux. His duties were proclaimed to the tribunes and the people in the following words:—'Let the doge alone preside over the government of the people with justice and moderation; let him appoint the tribunes and the judges, who shall administer justice both to clergy and laity, and if any one think himself aggrieved, let him appeal to the doge.' (And. Dandolo, lib. vii., c. 1.) The doge swore before the patriarch of Grado to obey the canons. The doge was commander of the forces of the republic; he appointed the military tribunes, or subordinate [illegible]. The conciones of the people on important occasions were convoked by the doge. The doge convoked all [illegible] of the inhabitants of the various islands or parishes for the election of their respective pastors. From the first the Venetians placed their clergy under subjection to the state. Doge Anafesto governed with wisdom; he made a convention with Liutprand, king of the Longobards, by which the boundaries of Maritime Venice were defined. These boundaries embraced not only all the islands and lagoons from the mouth of the Po to that of the Isonzo, but likewise a strip of the coast of the continent for about a mile inland. This was the origin of the metropolitan territory or province called Dogado, which for centuries constituted the only continental possession of [illegible]. This convention with Liutprand was concluded [illegible], and it established the political independence of Venice from the kingdom of Lombardy. The historian [illegible] records a maritime expedition of the Venetians against Felix, archbishop of Ravenna, who was at variance with the see of Rome, as well as with Theodorus, patrician, governor of Ravenna for the eastern emperor Philip Bardanes. The result was that the archbishop was defeated, taken prisoner, and sent to Constantinople. Doge Anafesto died A.D. 717, after having governed about twenty-one years. He was succeeded by Marcellus [illegible], likewise of Eraclea, which was then the head place of the community. Marcellus governed nine years; he was [illegible] at variance with the Longobards and with the patriarch of Aquileia. The latter was in continual disputes with the bishop or patriarch of Grado, who was metropolitan of the Lagoons. Doge Marcellus died A.D. 726, and was succeeded by Ursus of Eraclea, a warlike man, who encouraged the youth to military exercises, built new and larger ships, and extended the navigation of the Venetians. About this time, Liutprand having taken Ravenna, the exarch requested the assistance of the Venetians, who sent a fleet of eighty ships, under their doge Ursus, which, joined to the Byzantine forces, retook Ravenna, and restored it to the Byzantines. Reasons of neighbourhood and the interests of their commerce caused the Venetians to cultivate the friendship of the emperors, without acknowledging their supremacy. It is said that Pope Gregory II., who was afraid of the encroachments of the Longobards, urged the Venetians to assist the exarch.

About A.D. 736 a quarrel broke out between the inhabitants of two of the principal islands, Eraclea and Equilium. The doge, a haughty man, instead of calming the tumult, took the part of the Eracleans, and a civil war followed, in which both populations were nearly destroyed, and the doge himself was killed, A.D. 737. Some say that his pride and ambition made him obnoxious to the people in general, who killed him tumultuously in his own residence. The Venetians showed themselves from the first jealous of the

Digitized

rnment of one man, and this feeling is perceivable
ighout the long period of their history. The tribunes
ig met in council and convoked the assembly or
iblies of the people, the office of doge was declared
abolished; and a 'magister militiæ,' renewed an-
y, was appointed instead. The seat of government
ransferred from the now depopulated Eraclea to the
l of Matamauco, vulgarly Malamocco, an island near
iouth of the Brenta, which has since been partly sub-
ed by the sea, but the name of which is retained on a
bouring strip of land.

administration of the 'master of the militia' lasted
five years. The fifth master, Ziano, or John Fabri-
s, before he terminated the year of his office, was
l in a popular tumult and deprived of his sight by
ifuriated people, A.D. 741. The office of doge was
re-established by common consent in the person of
atus, son of the late doge Ursus, and his residence was
at Malamocco. Deodatus entered into new ar-
ments with Aistulphus, king of the Longobards, about
boundaries at the mouth of the river Piave near
ea. He afterwards repaired to Brondolo, near the
h of the Adige, and built a castle there for the pro-
on of the southern extremity of the lagoons. This
rise to a report that the doge wished to make himself
ute. Galla, an influential citizen of Malamocco, at
ead of a faction, seized the doge and blinded him,
nad himself elected in his place, A.D. 755; but he did
emain in office two years, for he was himself deprived
ght and then killed by the people. He was succeeded
Domenico Monegareo, A.D. 756; but in order to
ain his authority, two annual tribunes were appointed
his assessors. The prerogatives of their office are not
ly stated, but it appears that the doge Monegareo ill
ced the check: he came to an open rupture with his
sors, and was seized, and deprived of his sight and of his
, A.D. 764. Mauritius Galbaio was appointed in his
, and was so popular, that no tribunes were appointed
atch him, and he was even allowed to choose his son
n for his colleague, who, after his death, succeeded him
is office. This example was followed by several doges
r him, and was the occasion of many tumults, the
le every now and then resenting any attempts at esta-
ing an hereditary succession in the first dignity of the
. Out of about forty doges who succeeded each
r during a period of four centuries, nearly one-half were
er killed or had their eyes put out, or were compelled
dicate, and banished to some convent. The legal
of the election of the doge continued to be the same
towards the end of the twelfth century. At the death
doge the tribunes met and proposed a candidate, and
concio,' or 'general assembly of the people,' voted by
mation. The choice of one or more colleagues by
doge was also subject to the popular approbation.
ntime there was being formed at Venice a kind of
litary aristocracy of those families who had given
s to the republic, and the more numerous class of
who had had tribunes among their members, and
were styled 'familiæ tribunitiæ.' The office of tribune
inued till the end of the tenth century, after which it
entioned no longer, its place having been supplied by
judges of the palace and other magistrates instituted
ut that epoch. Till then we find three powers constitut-
the government, namely, the doge with his colleagues;
tribunes, who were civil and political magistrates, one
each island, and who met to deliberate on important
sions; and the 'concio,' or general assembly of the
le. (Sandi, *Storia Civile della Repubblica di Venezia*,
.)

hen Charlemagne, having conquered the Longobards
founded a new Western empire, settled with Nicephorus,
eror of the East, about the limits of their respective
inions, the provinces of Treviso, Forum Julii, Istria,
Liburnia were assigned to Charles; but the Dogado,
urisdiction of the Venetian lagoons, was not specified
eing included among them: it was left to its own in-
endence as a neutral district between the two empires.
onius, *De Regno Italiæ*, b. iv.; Ulric. Mutius, *De*
us German., b. ix.; Paul. Æmil., *De Rebus Francic.*, b.

But Pepin, son of Charlemagne, being appointed by
ather king of Italy, wished to extend his dominion over
coasts of Venice and of Dalmatia, which last was in
ession of the Byzantines. There were at the time two factions among the Venetians, one favourable to the new Western empire, and the other attached to the old connection of the republic with the Byzantine emperor. The latter prevailed, and envoys were sent to Constantinople to concert measures of defence against Pepin, who, in the year 808, having assembled a fleet at Ravenna, sent part of it to scour the coast of Dalmatia, and another part to blockade the Venetian lagoons, whilst his troops assailed by land the fort of Brondolo, which they took. Following the strip of land called Littorale, they captured Chioggia, Pelestrina, Albiola, and lastly Malamocco, which had been hastily abandoned by the doge and other members of the government, who removed to the island of Rialto, which was safer, being in the centre of the lagoons. Thus the seat of government was transferred to Rialto, A.D. 809, which, with the cluster of sixty or seventy islands around it, being gradually built upon and joined by bridges, became the city of Venice, although the town for a long time continued to be called Rialto. Pepin attempted to cross over to Rialto by means of a floating-bridge, but in so doing he was attacked by the light boats of the Venetians, who were well acquainted with the soundings of their lagoons, and was defeated with great loss. It is said that it was in memory of the numbers of the enemy who were either drowned or cut to pieces that one of the canals of Venice was called 'Canal Orfano.' Meantime the Byzantine fleet having made its appearance off the coast, Pepin, after burning Chioggia, Pelestrina, Albiola, and other places, withdrew to Ravenna. Soon after peace was made between the two empires, and the Venetians were left to their independence; for although Charlemagne and his successors considered them as being within the boundaries of the Western empire, they exercised no act of sovereignty within the islands, but acknowledged repeatedly the rights of the doge to govern the dogado, or duchy of Venice, and confirmed the boundaries settled between Doge Anafesto and King Liutprand.

The first doge elected in the new residence of Rialto was Angelo Participazio, who took for his colleague his son Giustiniano, who, after his father's death, succeeded him, A.D. 827. It was under Giustiniano that the body of St. Mark is said to have been brought from Alexandria in Egypt to Venice by a Venetian ship, and a chapel was built in honour of the Evangelist, which was the beginning of the magnificent cathedral of St. Mark.

About the middle of the ninth century the Saracens made their appearance in the Adriatic, and the Venetians began to encounter at sea this new enemy, whom they were instrumental in keeping away from the coast of Dalmatia. In the same century the Narentani, a Slavonian tribe from beyond the Danube, having occupied a part of the coast of the Illyricum, with the neighbouring islands, began to scour the sea as pirates. The Venetians sent a squadron of twelve galleys under the doge Pietro Candiano I., who attacked the Narentani near the coast of Dalmatia, but was killed in the fight, A.D. 887. Frequent fights between the Venetians and the Narentani occurred at sea during the whole of the following century, until the doge Pietro Orseolo II., who governed from A.D. 991 to 1008, having sailed with a strong armament for the coast of Dalmatia, the towns of Zara, Trau, Sebenico, Spalato, and others, which, being left without protection by the weak Byzantine court, were continually exposed to the attacks of the pirates by sea and of the half-wild Croatians by land, placed themselves under the protection of Venice, and swore allegiance to the republic. The towns of Parenzo and Pola in Istria did the same. Orseolo then attacked and took the islands of Curzola and Lesina, two nests of pirates; after which the Narentani obtained peace on condition of forsaking piracy. The doge on his return home assumed, with the consent of the people, the title of duke of Dalmatia. This was the first possession acquired by the Venetians beyond the boundaries of their lagoons, more than five centuries after the foundation of their sea-girt community.

The Byzantine court, distracted by other cares on its northern and eastern territories, did not object to this protection of a friendly people being extended over its western borders; and when the doge Orseolo sent legates to the emperor Basilius for commercial purposes, they obtained from that emperor ample privileges and exemption from duties for the Venetian traders throughout his empire. Similar, though not so ample, privileges were granted to the commerce of Venice with the Italian mainland by the German emperor Otho III.

The period of office of the doge Domenico Flabanico, A.D. 1032-42, is important in the civil history of Venice. Flabanico was at the head of a party of powerful citizens, who had driven away and banished some years before the doge Otho Orseolo, son of Pietro above mentioned, on suspicion of ambitious designs. Pietro Centranico, Otho's successor, after being a few years in office, was likewise expelled, and retired to a convent. Domenico Orseolo, a relative of Otho, was then installed, but after a few days was driven away. At last Flabanico himself was elected by acclamation. Having obtained his office as a popular leader and a defender of the liberties of the people, he proposed a resolution banishing for ever the whole of the Orseolo family as dangerous to the republic on account of its wealth, its ambition, and its alliance by marriage with an Hungarian or Slavonian prince. The resolution passed the assembly of the people, which also sanctioned two other resolutions, which, if not promoted, were at least not opposed by the doge—one abolishing the practice of having colleagues to the ducal dignity; the other re-establishing permanently the office of the two assessors of the doge, to be renewed annually, which had been before enforced for a time under the doge Monegareo. Another custom was introduced by Flabanico himself, and this was that the doge should in grave and important emergencies solicit the advice of some of the best informed and most esteemed citizens. The choice and number of these advisers were left to the discretion of the doge. This was the origin of the Council of the 'Pregadi,' or 'solicited,' which long after became permanently established as the Venetian senate. About A.D. 1094, under the doge Vitale Faliero, was established a supreme court of justice of three judges for the city of Venice, called 'Judges of the Palace,' and thus was taken from the doge the judicial power in appeal which he formerly exercised. It would appear that a gastaldus, or protector of the lower classes, attended the sittings of the judges, but further information is wanting concerning those antient institutions. (Sandi, *Storia Civile*, b. iii.)

In the latter part of the eleventh century the Venetians allied themselves with the emperor Alexius Comnenus against Robert Guiscard or Wiskard, the Norman chief, who, after having driven away the Byzantines from Apulia and Calabria, had seized upon Corfu, and was besieging Durazzo on the coast of Albania. The Venetians, jealous of the encroachments of the Norman adventurers in the vicinity of their Dalmatian possessions, willingly listened to the proposals of Alexius, and sent a fleet of 70 ships under the doge Domenico Silvio to the relief of Durazzo. The Venetians were successful in two actions, but the Normans afterwards obtained possession of Durazzo by secret intelligence with some of the garrison. A fresh Venetian force was sent to attack the place by sea whilst the Byzantines besieged it by land, but this time the Venetians were defeated and lost many ships. Doge Silvio on his return home was deposed and imprisoned, A.D. 1084. His successor Vitale Faliero sailed with a new armament, and completely defeated the Normans near Buthrotum. The emperor Alexius, as a reward for the timely assistance of the Venetians, gave to the doge the title of Proto-Sebastos; assigned annual pensions to the church of St. Mark and other churches of Venice; gave to the Venetians factories and houses and lands at Constantinople and other ports of the Levant; exonerated their vessels and goods from all duties and charges for ever; allowed their traders and merchants to live under the jurisdiction of their own consuls; and lastly, formally recognised their possessions in the Illyricum with the title of duke of Dalmatia, which had been already assumed by the doge.

At the epoch of the first Crusade Venetians vessels were employed from the first as transports to carry provisions to the coast of Syria. But afterwards, while the Crusaders were engaged in military operations in Palestine, the Venetians resolved to send a large armament to their assistance, and probably also with a view of extending their commerce in those parts. Two hundred vessels were equipped at the public expense, and many ship-owners lent their vessels for the common object, and they were manned partly by sailors of Venice, and partly by men enlisted for the purpose in Dalmatia. The command was given to the son of the doge Vitale Michieli, and to Enrico Contarini, bishop of Castello. The fleet touched at Rhodes, where they found a Pisan fleet of 50 sail, bent on a similar errand. A dispute arose between the two people, jealous of each other, and they came to blows. The Venetians had the superiority: they took 28 Pisan galleys thousands of prisoners, whom however they released except 100, whom they retained as hostages, and the continued their voyage to Jaffa, where they met Godfrey of Bouillon. He required the Venetians to co-operate the reduction of Kaïfa, which was taken, as well as mais or Acre, and Sidon. After these successes the Venetian armament returned home. Andrea Morosini written an account of those early Venetian expeditions.

In the early part of the twelfth century Coloman, Carloman, king of Hungary, invaded Dalmatia and Zara, Spalato, and other towns. The Venetians armament under the command of the doge Ordelafo Faliero, who retook Zara about A.D. 1116, as well Sebenico, Spalato, and Trau. He likewise occupied of Croatia beyond the mountains; but a fresh Hungarians came, by which the Venetians were and the doge died in the fight. A truce however made with the king of Hungary, and Venice retained dominion over Dalmatia and part of Croatia. (*Antiq. Ital.*, i., dissert. 17) registers a diploma laffo Faliero, in which he styles himself 'Dux Venetiæ Dalmatiæ, et Croatiæ.'

At the time of the second Crusade the Venetians armament under the doge Domenico Michieli, Tyre, A.D. 1124. According to a convention between Venetians and the king of Jerusalem, one-third of the was given up to the Venetians as a settlement jurisdiction. The same arrangement was made with to Ascalon. The Venetians accordingly sent two trates to Tyre: one, called Bailo, with judicial the other, styled Viscount, who was political and governor. In other towns of Palestine they had a for commercial purposes, with a church, a bath oven. These privileges were retained by the as long as Palestine remained in the hands of the tians.

Some time after a fresh war broke out in Dalmatia. emperor Manuel Comnenus, dissatisfied with the for the assistance they had given to the Latins and perhaps also jealous of their increasing and maritime prosperity, sent a force to the borders Dalmatia, when the cities of Zara, Spalato, and others volted against Venice. At the same time the seized the persons and property of the Venetian chants in his dominions. This was the first open between the Venetians and the Eastern empire, news created great alarm at Venice. The doge Michieli was sent to sea with a large fleet: he Trau, and, sailing into the Archipelago, seized islands of Lesbos, Samos, and Chios, and attacked the governor of which, in order to gain time, the doge to send ambassadors to Constantinople with the emperor himself. But while Manuel posely deferring the negotiations, the Venetian the Ægean sea was attacked by a pestilence, which mon report attributed to the Byzantines having the springs when the crews went for water. At last the doge, having lost most of his men, returned home only seventeen galleys, being obliged to abandon others. Meantime Enrico Dandolo, who was afterwards destined to act a great part in the destinies of the empire, remained at Constantinople as envoy of

It seems that on the doge's return the pestilence from the fleet to the town of Venice, and the people all the blame upon the unlucky doge. However no ceedings were instituted against him; but one day, he was out on some public ceremony, he was assassinated by a private hand near the church of S. Zacharias, 1172. This was the immediate cause of a great and ing change in the Venetian government. The frequent popular tumults, the assassinations of many doges, the summary mode of electing and deposing those magistrates by popular acclamation, and the disorders that accompanied these violent movements, made all those who had property (and in a thriving mercantile community like that of Venice they must have been a very numerous class) wish for a system of government that might ensure order and security. It was then in some manner or other agreed by the principal citizens during the six months of gnum which elapsed between the death of Michieli e appointment of his successor, to effect an organic ge in the constitution of the republic. A great cil was in future to take the place of the tumultuary nblies of the people. This council was to consist of some say 470 citizens, to be renewed annually on the day of September. This great council, which became representative assembly of the Venetian people, was ointed not directly by the people, but by twelve tors, two for each of the 'sestieri,' or districts of Venice; the town, being now built on the cluster of islands d the Rialto, had assumed a compact form, and was led into six districts. The members of the new cil were chosen in equal numbers from each district. more than four individuals of any one family could sit he council together. It is not stated that the more nt islands scattered about the lagoons were repreed; it would rather seem that they were not. How first electors were themselves elected, whether by the es or by the people, does not appear; but afterwards y year at the end of the session the council before ating appointed twelve electors, who proceeded to e the members of the new council. The doge was ght president of the great council.

nother contemporary innovation was this: four more sors or counsellors were added to the two who assisted doge from the time of Flabanico. These six counselwere chosen in the proportion of two for each sestiere istrict of Venice: they constituted the 'minor council,' ouncil of the Doge, which in after times, having unone some alterations in its constitution and powers, called 'La Signoria.' With the doge and his council ated all laws and ordinances, which were by them before the Great Council ('Consiglio Maggiore') for cceptation or rejection. They also nominated the es and other magistrates and officers of the adminison, subject to the approval of the Great Council. It also made imperative upon the doge and his council ases of importance to call other citizens, 'Pregadi,' to ult with them upon the matters to be proposed to the t Council. Some time after however, in the first part e thirteenth century, a permanent council of sixty was uted, with the title of Pregadi, the members of which appointed by the Great Council and renewed annuand thus the faculty of the doge to solicit extempoous advisers was abolished. The council of the Prebecame in course of time a most essential part of the etian state, and was by foreigners called the senate.

stly, the form of the election of the doge was also ged by the new constitution of 1172. The choice of ndidate had been till then vested in the council of the nes, some say in an assembly of Seniors, which some called, but it seems erroneously, the Council of Forty, he chosen candidate was announced to the 'Concio,' or ral assembly of the citizens, who decided by acclama- The election of the doge was now made to emanate from Great Council in the following manner:—The Great ncil chose twenty-four individuals, from among whom en were chosen by themselves, and these eleven proled to the church of St. Mark, and there in public elected new doge by plurality of votes. The new doge was then ented to the people for their approbation, with the ancement, 'This is the doge elect, if you approve of him.' e years after the number of electors was increased to , who were themselves chosen by four persons apted by the Great Council. These forty must not be ounded with the judicial council of forty instituted wards.

hether the new constitution, being thus framed, was before the assembly of the people and by them aped, is a matter of uncertainty, but it is supposed that such formality took place. The Great Council being lled, the election of the new doge, after an interregnum x months, took place. The choice fell upon Orio piero, a citizen bearing an excellent private character, however refused the dignity and pointed out to the ors Sebastiano Ziani, a wealthy and wise citizen. was elected amidst the acclamations of the people, 1173. He was carried in procession through the seated on a throne, and introduced the custom, h was ever after observed at every new election, of wing gold and silver among the populace. Ziani's government was prosperous. This was the time of the contest between Frederic Barbarossa on one side, and Pope Alexander III. and the Lombard cities on the other. The Venetians took the part of the pope and defeated the fleet of Frederic. In the year 1177 Pope Alexander repaired to Venice with the deputies of the Lombard cities, and the envoys of the emperor and of William, king of Sicily, and there a truce was concluded which led to the general peace of Constance. In July of the same year the emperor Frederic himself repaired to Venice, and was reconciled with the pope in the church of St. Mark. The doge Ziani acted the part of a wise mediator in these transactions. It was then that the pope, in token of gratitude, is said to have presented the doge with a ring, saying, 'Take this as a pledge of authority over the sea, and marry her every year, you and your successors for ever, in order that all may know that she is under your jurisdiction, and that I have placed her under your dominion as a wife under the dominion of her husband.' From that time the doges annually wedded the Adriatic, by throwing a ring into it, a ceremony which may appear to us absurd, but which was both impressive and important in those ages.

The Venetian navy, together with that of Pisa, shared in the third Crusade, and reconquered Ptolemais. But the Venetians acted a much more important part in the fourth Crusade, A.D. 1203. The Crusaders assembled at Venice, and borrowed the vessels of the Venetians to carry them to the East, on condition that they should first assist in reducing Zara, which had again revolted against Venice. The doge Enrico Dandolo, who during his residence as envoy at Constantinople had been cruelly used and had his eyes seared out by the emperor Manuel, contrived, after the taking of Zara, to lead the Crusaders to an expedition against Constantinople, which ended with the overthrow of the Byzantine empire, of the territories of which the Venetians had one-third for their share, and Dandolo bore the title of despotos of Romania. [BALDWIN I., EMPEROR.] The Venetians had the Peloponnesus, Eubœa, Andros, Ægina, Salamis, and other islands of the Ægean, Sestos and Abydos on the Dardanelles, several towns of Thrace, the Ionian Islands, the coast of Epirus and Acarnania, and the province of Durazzo, and lastly, the important island of Creta. To all these new possessions Venice sent governors and magistrates, with the titles of baili, consiglieri, and camerlenghi, chosen by the Great Council. Several Venetian families, as Sanudo, Pisani, &c., obtained the investiture of some of the islands of the Archipelago as fiefs of the republic.

Under the doge Pietro Ziani, who succeeded Dandolo, A.D. 1205-28, the first war between Venice and Genoa broke out, in consequence of the Genoese having assisted a petty Greek feudatory, styled count of Malea, in attacking the Venetian possession of Crete. The Venetians were obliged to employ a large force in the recovery of that important island. In order to strengthen their dominion of it, they sent thither a numerous colony of citizens chosen from the various sestieri, or districts of Venice, to whom lands were given in fief. A noble with the title of duke, assisted by counsellors, was appointed to administer the island, the internal government of which was constituted in imitation of that of the mother-country. Similar colonies were sent afterwards to the Ionian Islands, to Cyprus, and to Coron and Modon in the Morea. The Venetians and the Genoese, after some desultory fights at sea, made peace through the mediation of the pope, A.D. 1238, and it was agreed that both republics should keep a certain number of armed vessels at sea, bearing the flags of both nations, to repress piracy.

A disputed election after the death of Pietro Ziani, in which the electors, being equally divided between Renier Dandolo and Jacopo Tiepolo, were obliged to draw lots, when the chance fell upon Tiepolo, gave occasion to new devices which served to restrict the ducal power. A board was instituted of five 'correttori,' to be elected by the Great Council at every interregnum between the death of one doge and the election of another, whose duty it was to see that the regulations concerning the election of the new doge, and the form of the oath, or rather oaths, which he was to take at his installation, should be observed, and to suggest such modifications in the form of election as they thought expedient. Another board was appointed of three inquisitors, to inquire into the public conduct of every defunct doge, whether he had exceeded his powers, or had acted in any instance contrary to his oaths, or had favoured his relations at the expense of others, and the inquisitors had the power of fining the heirs of the doge or sequestrating his property.

On the death of Doge Tiepolo, A.D. 1248, a new form of election was proposed by the Correttori and adopted by the Great Council. The form was very complicated, and it is difficult to explain it intelligibly. Out of thirty members drawn by lot from among those of the Great Council who had completed their thirtieth year, a second ballot drew out nine. These nine elected forty members likewise of the Great Council, every one of whom must have the votes of seven among the nine electors. Then out of the forty, twelve were drawn by lot, who elected twenty-five, who were reduced by lot to nine, and the nine elected forty-five members. The forty-five were reduced again by lot to eleven, who chose forty-one electors of the doge. These forty-one, being shut up in the town-palace without communication with any one, proceeded to the election. Twenty-five votes out of the forty-one were required to create a doge. The first doge so elected was Marino Morosini, A.D. 1249, and this form of election continued till the fall of the republic. It was also enacted that the doge should not marry any woman not a native of Venice, and that he should not correspond with or receive letters from any foreign prince or prelate, or from the pope or any foreign community, without the knowledge and participation of his council, A.D. 1266.

Two other laws of importance were also enacted about that time: 1st, That no native of Venice should serve a foreign power either in war or in peace. This law was rigorously observed unto the latest times with regard to the patricians, who could not even quit the territory of the republic without permission, under severe penalties; but with regard to plebeians the law fell into disuse. The jealous spirit of the Venetian institutions was wholly directed against the patricians. No member of the aristocracy was allowed to form a matrimonial alliance with foreigners. Consequently we find in several instances that when a king of Hungary, or a king of Cyprus, or a grand-duke of Tuscany wished to marry a Venetian lady, the government assumed the paternal rights, adopted the intended bride as a daughter of the republic, and as such bestowed her on her royal suitor. The second law was that no Venetian should possess landed property on the continent of Italy. In course of time however, as the republic extended its territories on the mainland, it admitted the most powerful families of the conquered cities into the body of the patricians of Venice. These laws were introduced about 1275.

In 1258 war broke out again with Genoa. The quarrel originated in a private dispute between individuals of the two nations on the coast of Syria. The Venetians then attacked the Genoese in the harbour of Ptolemais, and burnt their vessels. The Genoese assisted Michael Palæologus to recover Constantinople from the Latins, and by so doing they shook the power and influence of Venice in the East. The Genoese obtained the possession of Smyrna and Pera, and other places. Several sea-fights took place, with various success, between the fleets of the two republics. In 1271 a truce was made, during which the Genoese attacked and destroyed the maritime power of Pisa. The Pisans had been allies of Venice in the former war. In 1294 the Venetians, who had been secretly preparing for the renewal of hostilities, attacked simultaneously the Genoese at Pera, in the Crimea, and in the Archipelago, and destroyed their factories. But the Genoese admiral Spinola defeated the Venetians in the gulf of Laiazzo, on the coast of Syria. A large fleet of 165 galleys, each carrying from 250 to 300 men, sailed from Genoa, and at the same time the Genoese sent a challenge to the doge of Venice, saying that they would meet the Venetian fleet half-way in the Sicilian sea. The Venetians however not choosing to answer the challenge, the Genoese returned home. In 1296 Lamba Doria sailed up the Adriatic with 78 galleys, and encountered at Curzola the Venetian fleet of 97 galleys under Andrea Dandolo, utterly defeated it, burnt 66 of the Venetian ships, and brought 18 to Genoa, with 7000 prisoners. The Venetian admiral, who was among the prisoners, killed himself on the way to Genoa by striking his head violently against a beam of the Genoese galley. The defeat of Curzola, one of the heaviest the Venetians had yet sustained, caused great alarm at Venice. At last, in 1299, peace was made on condition that the Venetians should be excluded from the Black Sea, and should not send armed vessels to the coast of Syria.

In the mean time another organic change had taken place in the constitution of Venice. After the death of Giovanni Dandolo, A.D. 1289, it appears that serious disturbances took place about the election of his successor, and a party, in which were many powerful men, reverting to the former popular method of election by acclamation, and proclaimed Giacomo Tiepolo as the new doge. But the older members of the council, disregarding this tumultuous outbreak, proceeded calmly to elect a doge according to the recently introduced complicated process. Tiepolo, alarmed at the danger of a civil war, and probably also at his own personal risk, renounced all claims to the ducal throne, and fled by night into voluntary exile. The choice of the electors fell upon Pietro Gradenigo, a man of antient family, in the prime of life, and of undaunted firmness and high military reputation. The announcement of his name was made to the people by one of the electors from a window of the ducal palace, with the usual form, 'The Doge Gradenigo is elected; if you approve him—' but without waiting for any signs of approbation from the multitude below, the elector withdrew, and Gradenigo was installed. Several years after the Council of Forty, at the suggestion of Gradenigo himself, passed a decree, to the purpose that the names of all those who had sat in the Great Council in the last four years should be laid before the Council of Forty, which was to choose those whom it thought proper of being admitted into the Great Council at its renewal; twelve votes out of the forty to be sufficient to secure the election. A certain number of seats, determined by the doge and his council, were filled in the following manner:—Three electors had the faculty of proposing candidates among those who had not the requisite qualification of having sat in the council during the four previous years, 'de aliis qui non fuerunt de majori consilio,' but some of whose paternal ancestors had formerly held a seat in the legislature. The candidate so proposed by the electors, if he were approved by twelve out of the forty, took his seat in the Great Council. This resolution, having passed the Great Council, became law, and is become a marked epoch in Venetian history by the name of 'La Serrata del maggior Consiglio,' the shutting up of the Great Council. It appears that those who were elected according to this new process in the year 129[illegible] were re-elected the next, without any new members being admitted. But in course of time the electors having widened the door, by proposing candidates belonging to families who had not previously participated in the offices of the republic, several decrees were passed excluding the 'new men,' a phrase then introduced for the first time in Venetian history, meaning those whose paternal progenitors, during the previous century, had not sat in the legislature. Still they were not irrevocably excluded: but the eligibility of a new man was made a favour, to be obtained by a public decree, in consequence of conspicuous services rendered to the republic. This indulgence was sparingly used, except on some great public emergency, such as the wars of Chioggia, Candia, &c., when new families were thus admitted among the hereditary legislators. Successive decrees of 1307, 1310, and 1315 required a candidate of this class to be proposed by five councillors of the Minor Council, approved by thirty out of the 'Forty,' and then to obtain two-thirds of the votes in the Great Council.

Two conspiracies were formed with the view of subverting the new constitution: one, at the head of which was Marino Bosconio, a plebeian, was easily put down, and Bosconio and some of his companions were put to death. The second conspiracy was more serious, having at its head several men of old families, the brothers Marco and Piero Querini, Boemondo or Baiamonte Tiepolo, Marco's son-in-law, and several of the family of Badoero. The two Querini were labouring under penalties or disabilities in consequence of official misconduct, and Tiepolo was a relative of Giacomo, who had been obliged to renounce the office of doge. They were all irritated against Gradenigo and the other leaders of the late organic change, because, although they themselves belonged to the aristocracy, yet by the new laws many families inferior to theirs were placed on a footing of equality with them, as hereditary members of the legislature. These aristocratic leaders were joined by many plebeians, discontented with the recent changes which they were excluded from the Great Council. ing assembled in considerable numbers in the night of 15th October, 1309, they sallied out from the Rialto rds the square of St. Mark. The doge Gradenigo, ng collected some friends and armed men in haste, untered Marco Querini, who had just entered the re, and killed him with his own hand; and Marco tiniani killed Bernardo Querini, the son of Marco. doge and his friends, who were joined by many of the ple, then turned against Tiepolo, who was coming up rrow street with another band of followers, but was on way saluted by the inhabitants of the adjoining houses a shower of stones, tiles, and other missiles: Tiepolo, ing his progress stopped by a host of enemies, re- ed his steps to the Rialto, where his friends dispersed he ran away. The story of his being killed by a er-pot let fall by an old woman is not mentioned by di, Muratori, and other historians, who say that he ped, retired to Treviso, and was afterwards put to th. Several other leaders were seized and executed at nice. The tumult being quieted, a commission of ten mbers was appointed by the Great Council, for two nths, to inquire into the ramifications of the late con- acy, and to try the guilty. At the expiration of the months the commission was continued for two months ger, and so on till January, 1311, when it was con- ued for five years as a supreme court for offences against state, and it was afterwards perpetuated till the last iod of the republic by the name of the Council of Ten. e members were renewed yearly by the Great Council. e council took cognizance of the crimes of treason and ition, of the murders of patricians, of malversation com- ted by magistrates and other officers under the repub- of the crime of coining, and of grave offences against rality or religion. Its principal business was to watch conduct of the patricians. Its proceedings were secret, l its sentences were executed in secret. Two members the Council of Ten, and a counsellor of the Signoria, or ecutive, renewed annually, under the title of State In- isitors, exercised the secret police of the state, ordered ests, and reported to the Council of Ten.

In 1315 a book was opened by the name of Libro d'Oro, the golden book, which was kept in the custody of the uncil of Forty, and in which all those who were entitled the preceding decrees to be candidates for seats in the eat Council were to have their names inscribed by the retaries, as soon as they attained the age of eighteen. is book became the register of the whole class of the ricians or nobles of Venice, who alone constituted the itical body. Their claims were severely scanned before ng inscribed in the golden book. They were not how- er admitted to vote in the Council until they were enty-five years of age. By a subsequent decree of 19 the office of the electors was abolished, no more ctions of new men being allowed; all those whose mes were inscribed on the book were declared, they and eir legitimate male descendants, to be 'de jure' members the Great Council as soon as they had completed their enty-fifth year. The number of such is said to have en at that period about 4800; about two centuries ter, when the Florentine Giannotti wrote his dialogues Della Repubblica e Magistrati di Venezia,' the number individuals qualified to sit in the Great Council was duced to about 3000 in consequence of many families ving become extinct in the interval. From out of this mber the Great Council chose the members of all the her councils and boards of administration, political and dicial, the magistrates sent to govern the subject pro- aces, the ambassadors to foreign courts, and all other ficers of importance under the state. The subordinate fices of the republic, as those of secretaries to the chan- llors of the various councils and tribunals, consuls, and sidents abroad, were filled by natives of the city of enice, who, though not qualified to sit in the Great Coun- l, belonged to some of the liberal professions, or to the gher trades, such as are now styled the middle classes. uations in the church were also filled mostly by citizens.

Having brought this sketch of the internal history of enice down to the complete establishment of its aristo- atic constitution at the beginning of the fourteenth ntury, which underwent no essential variation till the ll of the republic, we can only now register the dates of ome of the principal events of its general history.

A.D. 1338. Conquest of Treviso, the first town on the Italian mainland occupied by the Venetians, and formally ceded to them by Mastino della Scala, Lord of Verona.

1346. First symptoms of the third war with Genoa; mutual attacks upon each other's vessels in the Archipelago. The Byzantine emperor, offended at the overbearing conduct of the Genoese settlers in his own suburb of Galata, made an alliance with the Venetians. The Genoese under Filippo Doria assailed Negroponte, and plundered the town, and burnt it. The Venetians made an alliance with Peter of Aragon, who sent them his ships manned by Catalonian sailors, and the united force sailed into the Sea of Marmara, where it was joined by the Byzantine ships. The Genoese under Pagano Doria gained a victory, though dearly purchased. In the following year, 1353, the Venetians and Catalonians, having recruited their forces under Niccolo Pisani, met the Genoese fleet off the coast of Sardinia, and completely defeated it. The Genoese admiral Grimaldi escaped with 19 galleys. It is said that the victors purposely scuttled and sank a number of Genoese galleys with all their crews. In 1354 Pagano Doria with 34 galleys, sailed into the Adriatic, plundered the town of Parenzo in Istria, spread alarm within the Lagoons of Venice, then sailing to the Morea met his old antagonist Pisani, and defeated him, taking almost all his ships, and 5000 prisoners, among them Pisani himself, with whom Doria returned to Genoa, dragging behind his admiral-ship the great standard of St. Mark. The following year, 1355, peace was made, the Venetians paying the expenses of the war, their vessels being excluded from the ports of the Black Sea, with the exception of Theodosia, where they were allowed to have a factory.

1355. Conspiracy of the doge Marino Faliero, who out of revenge for a private insult engaged a number of desperate persons and men of the lower orders to revolt and kill all the patricians. The conspiracy being discovered, sixteen of the leaders were hung, and the doge was beheaded.

1376. Beginning of the fourth war with Genoa. It was a deadly struggle between the two rival republics, and Venice was ill-prepared for it. She was surrounded by enemies; Francesco di Carrara, lord of Padua, and the king of Hungary, had resolved her ruin. The king of Hungary had seized upon Dalmatia. The Della Scala of Verona, the city of Ancona, the patriarch of Aquileia, were also among the enemies of Venice. The Venetians had for their ally Bernabò Visconti.

1379. Naval fight near Pola, on the coast of Istria, between the Genoese admiral Luciano Doria, and the Venetians commanded by Vettor Pisani, who was obliged to give battle by the importunity of his subalterns, against his better judgment. The Venetians were completely defeated, and Pisani on his return to Venice was put in prison. The Genoese admiral having been killed in the fight, his brother Pietro Doria was sent from Genoa to replace him: with the victorious fleet he sailed for Venice, burnt Pelestrina, and took Chioggia by storm. The Lagoons lay open before him. The Venetians in extreme alarm sent envoys to Doria, who told them insultingly that he should not grant them peace until he had put bridles on their brass horses which stood on the square of St. Mark. Despair saved Venice. Ships were equipped, and everybody, even the women, assisted in the preparations for defence. The sailors called loudly for Vettor Pisani, who was released and intrusted with supreme command. The Genoese attempted to sail up near to Venice; they could already distinguish the people on the quays, but their ships drew too much water, and their pilots were not acquainted with the soundings of the lagoons, while the Venetians with their light boats hovered around them, and attacked them at every favourable opportunity. They also employed for the first time 'bombarde,' a kind of mortars or howitzers, which did great execution among the assailants. The Genoese withdrew to Chioggia, and contented themselves with blockading Venice in concert with the troops of Carrara. The Venetians, being in danger of famine, resolved to recover Chioggia. The doge Contarini, an old man eighty years of age, led the attack at the head of the troops. At this moment the admiral Carlo Zeno returned from the Levant with a large booty taken from the Genoese. He and Pisani sank one night some large ships filled with stones at the mouth of the harbour of Chioggia, and the Genoese squadron found itself hemmed in. The Venetians besieged Chioggia by sea and by land. Pietro Doria was killed in fighting, and at last the Genoese were obliged to surrender. Four thousand of them were taken prisoners to Venice, A.D. 1380. In the following year peace was concluded between the two republics at Turin, by the mediation of Amadeus VI., duke of Savoy. Fifteen hundred Genoese prisoners were released, the rest having died in the prisons of Venice, and the Venetian ladies clothed them and provided them with money to return home. Thirty plebeian families among those who had rendered eminent services in the late war were inscribed in the golden book among the patricians of Venice. This example was afterwards imitated on other occasions, especially during the Turkish wars.

1386. The Venetians obtained permanent possession of the island of Corfu, by a convention with the inhabitants, who had some time before driven away the Neapolitan garrison. Soon after Argos and Napoli di Romania were given up to Venice by the widow of Pietro Cornaro, the former lord of those towns.

1392. The republic, together with the marquises of Ferrara and Mantua, assisted Francesco II. da Carrara, called Novello, son of old Francesco the inveterate enemy of Venice, to recover possession of Padua, of which he had been deprived by Gian Galeazzo Visconti, duke of Milan. Francesco Novello afterwards repaired to Venice, when he swore perpetual friendship to the republic, and was inscribed among the nobility.

1404. After the death of Gian Galeazzo Visconti, whose ambition had alarmed all Italy, his dominions were attacked by his neighbours; Francesco Novello seized upon Verona in the name of Guglielmo della Scala, the heir of the former lords of Verona, whom he soon after put to death, and imprisoned his sons, remaining himself in possession of the town. He next attacked Vicenza, which also was in possession of the Visconti. The dowager duchess Catherine Visconti, unable to resist, made over to the Venetians her rights upon Vicenza, the citizens of which sent legates to Venice with the town keys. The republic then sent a herald to Carrara requesting him to abstain from molesting a town subject to Venice. Francesco replied by advising the Venetians to content themselves with fishing in their lagoons, and he had the ears and nose of the herald cut off. Venice declared war against Carrara. In 1405 the troops of Venice, commanded by Francesco Gonzaga and the Provveditore Emo, laid siege to Verona, the citizens of which by a capitulation gave themselves to Venice, retaining their municipal privileges and franchises. Belluno and Feltre, likewise forsaken by the duchess Visconti amidst the wreck of her late husband's possessions, gave themselves up to Venice. Lastly, in November, 1405, the important city of Padua was taken by the Venetian forces. Francesco da Carrara with one of his sons escaped to the citadel, which he surrendered to Galeazzo of Mantua on promise of being leniently treated. Galeazzo gave a safe-conduct to the envoys whom Francesco sent to Venice, but they could not obtain an audience of the doge. At last Francesco went himself in November, 1405, was admitted to the presence of the doge Steno and the Signoria or Council, who reproached him with his ingratitude towards the republic. Francesco and his son and namesake were sent to prison, where they found the other son Jacopo, who had been taken prisoner at Verona. After some deliberation the Council of Ten passed sentence of death on them all. On the 17th of January, 1406, Francesco Novello was strangled in prison, and two days after his two sons were likewise put to death.

1412-20. After a long war and internal factions in the province of Friuli, between the Hungarians, the Patriarch of Aquileia, and the citizens of Udine, some of whom asked for the assistance of the Venetians, the town of Udine surrendered to Venice, and the rest of the province followed its example. Thus in the course of a few years Venice established her dominion over a large part of North Italy, from the Julian Alps to the Adige and the Mincio. These were afterwards styled 'the old Venetian Terra-Ferma.' With regard to the character of the Venetian administration in those fine provinces, we will quote, not the Venetian historians, but a modern writer who is generally far from friendly to the Venetian aristocracy. 'The people of Venice were deprived, almost as much as those of Milan, of all participation in political power. Their suffrages were never demanded; their voice was never heard; they never thought even of questioning the wisdom of their government. But the senate, far wiser in its administration than the tyrants of Lombardy, never allowed its subjects to bear any other burthens than those imposed by itself, and those were always moderate, always equally distributed in a spirit of justice. All that the Venetians paid to the state was employed scrupulously and with economy, either for the common defence or the embellishment of their country . . . . The provinces of Terra Ferma were secured from the vexations of the soldier, and as much as possible from the invasion of the enemy. Forgetting all pretensions to independence, the people of those provinces found themselves happy in comparison with their neighbours. The peasantry in particular were ready to give their lives for St. Mark—it was thus that they always designated the state.' (Sismondi, *Italian Republics*, in the 'Cabinet Cyclopædia,' ch. x.)

The administration of the doge Tommaso Mocenigo, 1413-23, was perhaps the most prosperous period in the history of Venice. The republic possessed Candia [illegible] the Morea, several of the Ionian Islands, numerous islands in the Archipelago; Dalmatia and part of Albania, and the newly-acquired Terra Ferma. It had factories all over the Levant, in Egypt, at Constantinople, and carried on the greatest part of the traffic between Europe and Asia. The statistical reports (for the science, though not by name, existed already at Venice) laid before the Senate by the doge Mocenigo in 1420-21, are a striking evidence of this prosperity. He stated the quantity and quality of manufactures exported from Venice, of the cotton, silk, dyes, and other articles imported to Venice from the East; the sums of money that were annually remitted to Venice from Milan, Florence, and other places; the value of houses in Venice; the number of sailors and soldiers, and of merchant-vessels. He also stated the number of individuals qualified to command fleets, the number of eminent statesmen; and lastly, those who were qualified for the office of doge. On his death-bed, he called the principal senators to him, and said, 'I leave the country in peace and prosperity; our merchants have a capital of ten millions of golden ducats in circulation, upon which they make an annual profit of four millions. I have reduced the public debt by four millions of ducats. We have forty-five galleys, and 300 other ships of war and merchant-vessels, 52,000 sailors, a thousand nobles with incomes varying from 700 to 4000 ducats each; eight naval officers fit to command a large fleet, 100 others to command smaller squadrons; many statesmen, jurisconsults, and other wise men. One thing only gives me uneasiness. You are about to choose a new doge. You have several men wise, and prudent, and fit for the office, but if you choose Francesco Foscari, you will have war very shortly, and your fortunes and the fortunes of the state will suffer by it.'

1423. Francesco Foscari was elected, and war broke out with Filippo Maria Visconti, duke of Milan, which was carried on by mercenary troops, and cost Venice seven millions of ducats. [CARMAGNOLA, FRANCESCO BUSSONE DI.] One result of this war was the acquisition by Venice of the three provinces of Brescia, Bergamo, and Crema, by which the territory of the republic became extended to the Adda, and which were styled in administrative language the provinces 'Oltre Mincio,' beyond the Mincio in relation to Venice. The policy of this increase has been questioned, as it drew Venice deeper into the vortex of Italian politics. It led soon after to a war with Francesco Sforza, who made himself duke of Milan. Foscari was doge for thirty-four years: he was ambitious and hot-headed, and had many enemies. His son Jacopo Foscari was accused of treasonable practices, was tortured, and banished to Candia: after some years he entreated to be allowed to return to Venice, and being refused, he bethought himself of the expedient of appearing guilty again. He wrote to the duke of Milan to intercede for him, which was treason in a Venetian noble. The letter was intercepted and taken to the Council of Ten. Foscari was brought back to Venice, and although he declared his object in writing the letter, he was again put to the torture, and then sent back to Candia. Shortly after, in October, 1457, his father Francesco Foscari was deposed

he ground of age and incapacity. The old man died
en-hearted at hearing the bell of St. Mark toll for
inauguration of his successor.
53-78. Wars, interrupted by truces, between Venice
Sultan Mohammed II. The Venetians lost Eubœa and
nos, and part of the Morea. The Turks overran Friuli
far as Udine, but retired. The Venetian general
enigo landed in Asia Minor, to act in concert with
Persians under Husum Cassan, but the Persians were
ated by the Turks. Mohammed conquered Albania, and
Scutari from the Venetians. Peace was made with
Turks in 1478, the Venetians obtaining permission to
e in the Black Sea and to keep a bailo, or envoy, per-
ently at Constantinople.
489. Venice makes the acquisition of the island of
rus, by a donation of Catherine, widow of the late
James, who was herself a Venetian of the house of
naro. A colony of 100 Venetian nobles was sent to
rus, with a lieutenant-general, councillors, and a
ncellor appointed by Venice. Cyprus, Candia, and
Morea were styled kingdoms subject to Venice, and
r standards waved for many years on three lofty staffs
ted in the square of St. Mark.
08-16. War of the league of Cambrai against Venice.
Julius II. required the Venetians to give up Ra-
a, Cervia, Faenza, Rimini, and other places of the
agna, which they had taken possession of at various
ods during the preceding century, by purchase or
quest. The Venetians offered to pay allegiance to the
of Rome as feudatories of those places, but Julius
ired unconditional restitution. Upon this the pope,
is XII. of France, Ferdinand of Spain, and Maximi-
I. of Austria formed a league to spoil the Venetians
ll their continental territories. The French defeated
Venetian army under Alviano at Agnadello; the
nans came from the north, and the whole Venetian
a Ferma was overrun, pillaged, and treated in the
t atrocious manner. The troops of the republic had
drawn to Mestre on the border of the lagoons. Sud-
ly Pope Julius conceived a dislike for his allies; he
hed to clear Italy of all foreigners, and having re-con-
red the Romagna, he entered into negotiations with
ice. [Julius II.] This saved the republic from destruc-
, though it was greatly weakened by the losses it
ined during the rest of the war. Ultimately the
e of Noyon between Charles V. and Francis I.
red peace to Italy for a while, and Venice recovered
continental dominions, with the exception of the
magna. From that time the Venetians endeavoured
teer clear as much as possible of the subsequent wars
took place in Italy between the French, Spaniards, and
mans. At the same time they seemed to draw more
ely their relations with the house of Austria with respect
heir common enemy the Ottomans.
537-40. A new Turkish war, in which the Venetians
Nauplia and their other remaining strongholds in the
rea, and all the islands of the Archipelago, Candia
epted.
570-73. War of Cyprus, in which Venice lost that
nd. [Cyprus.]
1618. Conspiracy of the marquis of Bedmar, Spanish
bassador at Venice, against the republic. Venice had
g since drawn upon itself the hatred of Spain, because
stood in the way of the ambitious views of that court,
cause it was the constant policy of the senate to preserve,
much as it lay in their power, a balance in Europe, by
wing nearer to France, by keeping up a good under-
nding with the other republics, the Dutch, the Grisons,
d the Swiss, and by supporting the duke of Savoy
ainst Spain. The Spanish viceroy of Naples and the
anish governor of Milan encouraged Bedmar to strike
e blow. He engaged several desperate adventurers,
iefly foreign mercenaries in the service of Venice,
sides a number of artisans and other men of low con-
tion, who were to set fire to the arsenal and other public
ildings, and massacre the doge, senators, and nobles,
d give up the city to indiscriminate plunder. A Spanish
uadron which had sailed from the ports of Sicily entered
e Adriatic to be ready. The day of the Ascension, on
e occasion of the great solemnity of the doge's wedding
e sea, was fixed for the attempt. One of the conspi-
tors however turned informer; the others were seized,
ied, and hanged, and their bodies exposed in the square of St. Mark. The particulars of the trials were, as customary in matters of state, kept a profound secret: the Spanish ambassador was escorted in safety out of Venice. He published, or caused to be published, a political treatise in which he, a minister of despotic and ultra-Catholic Spain, speaks of the Venetian people as oppressed by an oligarchy, which he calls irreligious, because the clergy was subject to the civil power, and he foretells the fall of the republic as imminent. It lasted however about two centuries longer. This book, which made great noise at the time, is entitled 'Squittinio della libertà Veneta.'

1645-69. War of Candia, in which the Venetians, under a succession of able commanders, displayed uncommon gallantry, ability, and perseverance. The island at last fell into the hands of the Turks. The capital surrendered by capitulation. Its senate, the reflected image of that of the parent state, returned into the Great Council of Venice, from which it had emanated. [Candia.]

1684-99. A new war between Venice and the Porte. The Venetians, under the gallant Francesco Morosini, who had served in the war of Candia, reconquered the Morea and Ægina, besides several places in Dalmatia, which were secured to Venice by the treaty of Carlowitz. [Morosini.]

1714-18. The Turks again invaded the Morea and conquered it, and Venice renounced its claims to it by the treaty of Passarowitz, in June, 1718. This was the last war between Venice and the Porte. Venice abstained during the whole of the eighteenth century from taking any part in the wars which disturbed Italy. But during this long period of peace she was hastening to decay; her former spirit was fled, her commerce had passed into other hands, many of the nobles had become selfish and licentious, the majority of them were poor and mercenary. The state inquisition had greatly relaxed from its former vigilance. The soundest part of the population was among the lower orders, who were still enthusiastically attached to St. Mark, which with them was synonymous with the republic. We do not quote from any panegyrist of Venice, but from a contemporary writer professedly and hereditarily hostile to the Venetian aristocracy: 'Social life at Venice was smooth and easy. Things were so ordained that the people were caressed, and all sorts of amusements encouraged. "Semo a Venezia" was the common expression to denote the perfect liberty in which any one might indulge. Commerce was protected; the nobles mixed familiarly with all classes of people, every patrician house having a certain number of persons dependent upon its interest and good offices with the government; this connection of patrons and clients maintained a spirit of mutual good feeling between the various classes; the yoke was thus adorned with flowers, and was rendered less irksome through the long habit of wearing it; its antiquity made it appear venerable. There was no other political constitution in Europe older or better supported by glorious reminiscences and a long course of prosperity. The citizen of Venice, respected and well treated wherever he went, willingly forgave his many sovereigns their aristocratic laws; the aspect of his own thriving country, the activity of commerce, opulence and ease, and pleasure were to him a sufficient compensation for political dependence.' (Dandolo, *Lettere su Venezia*, 1827.)

The only danger for a person at Venice was that of speaking about internal politics, for the politics of other countries might be freely canvassed; but the people were so accustomed to reserve, that any indiscretion was seldom committed. 'De Deo parum, de Principe nihil,' was an old proverb characteristic of Venice. By the word 'prince' the government was meant. The knowledge that there were inquisitors of state who, through their numerous spies, were supposed to be omnipresent, was sufficient to restrain all tongues, and maintain order and respect for the existing institutions. 'Whilst in all other great Italian cities, in all popular festivals or large assemblies, a large attendance of police or military was considered indispensable for the public tranquillity and security, at Venice, a few years before the fall of the republic, only four servants of the inquisitors, with their black staffs in hand, were sufficient to restrain the immense multitude which thronged the square of St. Mark and the adjacent streets and avenues on the day when the government gave a splendid festival and bull-fight in honour of the grand-duke Paul of Russia and his wife, who were travelling in Italy under an assumed name.' (*Ibid.*)

In 1789 the population of the territories of the Venetian republic was as follows: city of Venice, 139,095 inhabitants; the Dogado, or metropolitan province, 100,042; province of Brescia, 289,658; Salò, 41,918; Bergamo, 215,191; Crema, 40,555; Verona, 226,172; Vicenza, 221,186; Padova, 273,371; Polesine di Rovigo, 63,330; Marca Trevisana, 363,219; Palma, 3721; Patria del Friuli, 329,063; Cividale del Friuli, 30,176; Istria, 92,016; Pinguente, 7367; Dalmatia and possessions on the coast of Albania, 259,966; Isole del Levante, or Ionian Islands, 144,959; Jews scattered on various points, 3207: total, 2,844,212. (Quadri, *Prospetto Statistico delle Provincie Venete.*)

The public revenue was estimated at about nine millions of ducats, or about two millions sterling. The military consisted of 6000 regulars, besides 18,000 Slavonians and Dalmatians, and about 30,000 militia of the Italian provinces. There were twelve ships of the line, besides about fifty galleys and smaller vessels. (*Racolta Cronologica di Documenti inediti che formano la Storia della Rivoluzione e Caduta della Repubblica di Venezia.*)

When the French revolutionary armies began to threaten Italy on the side of Piedmont, the Venetian government was invited by the emperor of Germany and his allies to join the coalition against France. The question was debated in the Senate, or Council of Pregadi. Francesco Pesaro, one of the most distinguished members of that assembly, spoke to the effect of maintaining the accustomed system of neutrality which the republic had followed for a century past in all continental wars, but he insisted upon its being an armed neutrality in order to make the territories of the republic respected by both the belligerent powers. He advised to call out the 'cernide,' or Italian militia, to equip the navy, and to send a body of Slavonian troops to guard the provinces of Terra Ferma. The senator Vallaresso, one of the 'Savj,' or Elders, spoke in favour of pure and simple neutrality without any warlike preparations. His advice was adopted almost unanimously, and it proved the ruin of Venice. The republic continued to keep its ambassador at Paris, and the French republic its chargé d'affaires at Venice. Meantime the Count de Lille, brother of the late Louis XVI., had fixed his residence at Verona, and had assumed the title of Louis XVIII. The French Directory, in March, 1796, requested his expulsion from the Venetian states, and the Senate submitting to this request, Louis was obliged to quit Verona for Germany, after writing an indignant protest against this inhospitable treatment. Shortly after Bonaparte penetrated into Piedmont, and invaded the Milanese and Mantuan territories belonging to Austria. The frontier towns of the Venetian states, Bergamo, Brescia, Crema, Peschiera, and Legnago, were left by the neglect of the Venetian government in a defenceless state. This circumstance however requires explanation. There was at Venice a board of six patricians, elected by the Great Council, and called Savj del Consiglio di Pregadi, for they had seats in the Senate, whose business it was to receive all dispatches from the foreign ministers at Venice or from the Venetian ministers abroad, as well as the secret communications of the State Inquisitors on affairs of state, and after having examined them and written their own opinion on the contents, to lay them, if they thought them of sufficient importance, before the Senate for its final decision. The board of the Savj was in fact a council of ministers. Now at the epoch of the French invasion of Italy, and for some time previous to it, numerous important despatches were received by the Savj and never communicated to the Senate, which was thus kept ignorant of the dangers that threatened the state. A file of more than one hundred despatches, besides private communications from the state inquisitors, was afterwards found in the secret archives, labelled 'Filza di comunicate non lette in Senato,' most of which are textually given in the work 'Raccolta di documenti inediti, che formano la Storia diplomatica della rivoluzione e caduta della Repubblica di Venezia,' 2 vols. 4to., Florence, 1800, a work quoted by Daru and the other contemporary historians. The reasons for this strange conduct of the 'Savj' may have been various: one was evidently the wish to preserve their favourite system of unarmed neutrality; but another is plainly hinted at with regard to some of them at least, and that is disaffection towards the state—for there is no doubt that several influential patricians were seized with the prevalent revolutionary ideas of the time, and longed to secret societies which corresponded with the clubs of France, Milan, and other places. Some of threw off the mask after the fall of the aristocratic vernment, and publicly wrote and spoke in favour of cracy.

Bonaparte entered Milan on the 14th of May, the Austrian forces retired towards Mantua. French took the parallel road through the states by Brescia to the banks of the lake of Garda, order to cut off the communications of the Austrian tiring army with the Tyrol. The Austrians, having a sufficient garrison into Mantua, took possession Peschiera, a Venetian fortress at the southern the lake of Garda, to secure their retreat to the Tyrol. French, who had already violated the neutrality of by entering Brescia, made much noise about the occupying Peschiera; and as this was the ground of future hostile conduct towards Venice, some is required.

Austria having become possessed of the duchies of and Mantua at the beginning of the eighteenth was agreed by Venice, whose territory was tween the Milanese and the other Austrian that the Austrian troops should be allowed to from Milan through the Venetian territory by the road, without entering any of the fortified towns, any military position, or constructing defences territory. The road generally taken by the troops was that of the Tyrol and along the shore lake of Garda to Mantua. When Beaulieu, in May, was driven from the banks of the Adda by he retired through the Venetian territory Mincio for the defence of Mantua. Bonaparte him and entered Brescia, a walled city Venice, where he quartered a division of his He thence issued a proclamation, dated May stating that in passing through the Venetian would pay all due regard to the friendship between that antient republic and France, that he pay cash for everything supplied to his soldiers. Beaulieu, hearing of the occupation of Brescia by French, gave orders to one of his officers to occupy chiera, a fortified town of the Venetians, in order to tect his communications with the Tyrol. Peschiera only garrisoned by a few Venetian invalids, and its were mostly without carriages. The officer it had represented the defenceless condition of the but the Provveditore Foscarini had neglected the A few days after, Beaulieu being defeated at the French, retired into the Tyrol, and the Austrians which had occupied Peschiera evacuated it to main body. The French then entered Peschiera risoned it. Bonaparte said that the Venetian ought to have garrisoned Peschiera so as to Austrians entering it; and he seized this as a opportunity of frightening the Venetian senate mission to his dictates. He was writing at the to the Directory the real truth of the case, namely, Peschiera was destitute of defence when the entered it by a stratagem. 'If your object,' he added, to draw five or six millions from Venice, you have fair pretence for a rupture. You can ask the an indemnity for the battle of Borghetto, which I in consequence of the taking of Peschiera. If you further views respecting Venice, we may protract this ject of recrimination until more favourable we must not quarrel with everybody at once.' parte's *Correspondence—Letter of the 7th of June,*

The Provveditore Foscarini, whom the Senate had to Verona as captain-general, came to Bonaparte's quarters to justify himself about the business of chiera. Bonaparte received him very ill, spoke of against Venice, brought forth the old charge of its given an asylum to the Pretender (Louis XVIII.), and last concluded by demanding imperiously to be ingress into the fortified town of Verona the next where he intended to leave a garrison till the end of the campaign. If refused, he would storm the place. The conversation took place on the 31st of May, two days after the date of his proclamation from Brescia, in which he professed a friendly regard for Venice. Foscarini, not having time to receive instructions from Venice how to ıd knowing the Senate's wish to avoid hostilities, ıted, and the French on the 1st of June entered a. They afterwards entered Legnago, Bergamo, ı, and any other Venetian town, whether fortified or hich suited their purpose, demanding at the same rovisions, carts, horses, &c. They left the civil ment however in the hands of the Venetian authori- fter this all scruples about neutrality were at an end, th Austrians and French entered the territories and of the republic whenever and wherever they pleased. mpaigns of Bonaparte against Wurmser and Alvinzi arried on chiefly on the Venetian territory.

French troops lived upon and at the expense of enetian States for nearly a twelvemonth, and the which they made was much greater than the actual nption of necessaries. The districts near the Adige ıe beautiful shores of the lake of Garda suffered the The remonstrances of the senate to Bonaparte and rectory produced no effect. Bonaparte alleged the ıeies of war, and one of the Directors, Rewbell, ly complained to the ambassador, Querini, that the ians did not like the French. Bonaparte affected to ieve altogether the reports of outrages committed by ldiers, which were communicated to him by the ian Provveditore in December, 1796, and yet on the October preceding he had ordered his chief of the o place patroles on the road from Verona to Bassano, der to stop the excesses committed by the French ry, who plunder or devastate the country.' But in er he wanted to conciliate the Venetian senate, as ızı was upon the point of advancing; and in Decem- ıe had defeated Alvinzi, and his tone towards the changed. At the end of December General Bara- d'Hilliers, by order of Bonaparte, surprised the of Bergamo and drove the Venetian garrison away. ommandant of Peschiera did the same, and arrested enetian governor. In March, 1797, a revolt broke Bergamo and Brescia against the Venetian authori- and the French commandant at Bergamo openly took part of the insurgents, stopped and opened the dis- es of the Venetian Podestà, and then arrested that r and sent him out of the town. The insurgents were d by a number of Milanese, Poles, &c., and they threw ıe allegiance of Venice, and pulled down the flag and emblems of the republic. At Crema the same thing one by a body of French troops who had asked leave s through that town. The senate on hearing this asked the French minister at Venice for explanations s strange conduct, and the minister answered that he nothing of the matter. The senate then dispatched nobles to Bonaparte, who was then at Gorizia in pur- f the archduke Charles. Bonaparte told them that ould not interfere between the senate and its revolted cts, that the senate might take such measures as it ght proper, provided it respected the French garrisons h had possession of the castles of Bergamo and Brescia, he ended by proposing an alliance between Venice France, on which condition he would help them to down the insurgents. This however was declined by Venetian envoys. Bonaparte has denied having had thing to do with revolt in the Venetian states (Bou- ne's *Memoirs*), observing that he had too much tact to ite tumults in his rear whilst he was advancing into the trian hereditary states. But he had given the impulse re; he had manifested on many occasions a hostile it towards Venice, and the officers who remained in bardy were not so cautious as himself. It is well wn that for months before these events both the Direc- and Bonaparte had foreseen the expediency of giving emperor at the peace a compensation out of the Vene- territory. Had the senate accepted the alliance of nce, and thus put itself in hostility towards Austria, would perhaps only have facilitated the views of the ectory, as Austria would have felt less scruple in shar- the spoils of an enemy. The senate was as much id of Austria as of France.

he revolutionists of Brescia and Bergamo threatened other provinces which remained in obedience to the ate, and especially the Veronese. The senate sent troops Verona to defend that important city. The country- ple in the neighbourhood were armed and placed under command of Count Emilj. The peasantry of the other vinces followed the example, and attacked the revolutionists of Bergamo and Brescia in several places, especially at Salò, where they beat them, and made many prisoners, including a detachment of Poles in the French service, who had fought on the side of the revolutionists. At the same time the peasantry in some districts, being excited against the revolutionists and the French, killed several of the latter who were marching in small parties through the country. Bonaparte hearing this, and having now signed the armistice with the Austrians, in which the question of compensation to the emperor out of the Venetian states had been already suggested, dispatched Junot to the senate with a furious message, exaggerating the outrages committed against his soldiers, and threatening vengeance. The preliminaries of Leoben were signed on the 18th April. Meantime, and on the 17th, a frightful tumult broke out in the city of Verona between the people and the French who garrisoned the castles.

This insurrection of Verona and the adjacent country has been urged as evidence of the senate's intentions to cut off the retreat of the French, and make another Sicilian Vespers of it. Here we must again recur to dates and documents, and it is only necessary to read the despatches of the French generals themselves, as quoted by Count Daru, in the *Pièces Justificatives* at the end of his 'Histoire de la République de Venise,' vol. viii., and which are in fact extracted from Panckoucke's correspondence of Bonaparte already quoted. General Kilmaine, in his despatch dated Milan, April 5, began by assuming that the senate's design was to make a crusade against the French, and quote as a proof of it a pretended proclamation, by the Provveditore Battaglia, which was afterwards proved to have been forged at Milan. Kilmaine upon this, ordered detachments of French troops to disperse all the armed peasants they met in the Venetian territory of Bergamo. After this he concluded his despatch by saying it would be desirable to stop some of the couriers which Grimani, the Venetian ambassador at Vienna, was sending to the senate, 'as Grimani's long conferences with the Austrian ministers make me *believe* that the senate is hatching some perfidy against the French army.' So it was only a supposition after all. In his previous despatch, 3rd April, he had said that the peasants of the valleys of Bergamo were arming under the pretence of reducing Bergamo, and that their war-cry was, 'Death to the Jacobins and to the French.' And he added that the Venetian government might have reduced Bergamo by means of its regular troops. But how could they have done this while a strong French garrison occupied the town and the castle and evidently protected the insurgents? It would have brought on an open collision between the troops of the two states. The French general Balland, who commanded at Verona, wrote (5th April) that the Venetian general having thrown a bridge across the Mincio for the purpose of acting against the insurgents of Brescia and Bergamo, the French commandant of Peschiera sent a detachment to cut down the bridge, and Balland approved of this measure; and this same Balland afforded protection in the castles of Verona to several revolutionary leaders from the hands of the Venetian authorities. So much for French neutrality and the freedom of operations allowed to the officers of the senate. The French minister at Venice, Lallement, writes confidentially to Bonaparte, the 5th April: "There is no doubt that General Dombrowsky and the Polish legion have taken part with the insurgents in the affair of Salò. I am asking satisfaction for the French soldiers, killed in this affair, but I am aware that the truth is already known here. . . . Do you suppose that the French soldiers who have been fighting these six years in the name of liberty, will not support those whom they consider as their brethren in the same cause? No authority will be able to restrain them, and the insurgents, knowing this, will show themselves more openly, and the explosion will become general. I see already an instance of this in the Polish legion.'

This letter would be sufficient to show the real truth. But the despatches of the Venetian provveditore at Verona explain the whole affair of the insurrection still more clearly. They are found in the *Raccolta Cronologica* of documents before mentioned. The senate gave orders to save Verona from the revolutionists who were threatening it. The regular troops not being sufficient, the peasants were armed and placed under the command of some noblemen. They had orders to attack the insurgents. The French garrison *in* the castles of Verona seeing great multitudes of people assembled, fired some shots upon the town, and thus committed the first act of hostility. The people then could no longer be restrained, although the Venetian authorities did all they could to prevent it, or at least to save the French soldiers. Those that were taken at the gates of the town by the armed peasantry were saved. Those scattered about the town were killed by the mob, and the same happened in several parts of the country. The French from the castles of Verona were now cannonading the town and the people who were trying to assault the castles. The provveditore Giovannelli endeavoured to obtain a suspension of hostilities, but he could not prevail on either party. The other provveditori of Vicenza and Padua received orders from the senate, dated 22nd April, while the fight was continuing in Verona, directing them to take every measure to prevent disorders on the passage of the French troops, and to punish those persons who should create any disturbance. It were superfluous to accumulate evidence to show that the insurrection of Verona was purely accidental and local, and formed no part of a preconcerted plan against the French. French troops now poured in against Verona, and after an irregular defence it surrendered. Count Emilj and others who had commanded the peasantry were shot by the French; a contribution of 170,000 sequins was required from the city, the Monte di Pietà was plundered, the plate of the churches seized, and much private property shared the same fate. Augereau, who was sent to Verona, wrote an indignant letter to Bonaparte, saying that Verona, Vicenza, and the country around had been shamefully plundered, that whole villages were depopulated, families wandering about without a home, &c. (See an account of this plunder in Bourienne's *Memoirs*, Appendix to vol. v.; and also in Bonaparte's *Correspondence*.)

The Senate, on the first news of the Verona insurrection, despatched two deputies to Bonaparte, who met him at Grätz on the 25th April. They had with him a long and painful conference, of which they sent a report to Venice, dated Gradiska, 28th April, and which is a most important document concerning these transactions. Bonaparte said he had offered alliance to Venice while the archduke was in arms against him, but now he should dictate the law; he should prove another Attila to Venice; that Venice must deliver to him all the English property, send away the English minister, punish all those who had insulted the French, release all state prisoners, and he ended by saying—'But your government is old, it must cease.' He inveighed against the abuses, some true and others exaggerated, of the Venetian constitution. In the mean time another fatal incident occurred at Venice. A French armed vessel forced its way into the harbour, against the express regulations of the place, and in spite of the summons of the port-officers. The vessel fell against a Venetian galliot manned by Dalmatian sailors, who, drawing their cutlasses, leaped on board the Frenchman, killed several men, including the commander, and wounded others. When Bonaparte heard of this, he demanded that the port captain, the three inquisitors of state, and other persons should be delivered up to him; and in the meantime he ordered all the Venetian towns of the Terra Ferma to be seized, and issued a turgid manifesto dated from Palmanova, declaring war against Venice.

Venice might have defended itself, but there were some traitors and many cowards amongst the senators, who fancied that they could, by submitting to the will of Bonaparte, avert their doom. They sent away their Slavonian soldiers, many of whom were killed in attempting to resist the order to embark them for Dalmatia: they consented to change their constitution, and at last, with the doge at their head, abdicated their power; and as the people threatened to defend the old system of government against its own members, the Venetian commander of the lagoons sent boats to carry over a body of French troops into Venice. A sort of democratic council was formed; several millions of francs were paid by Venice to France. Meantime Bonaparte ordered the Arsenal to be stripped of everything; paintings, statues, and MSS. from the ducal palace were carried to France; 200,000 sequins belonging to the duke of Modena were also seized. French troops sailed on board the Venetian ships of war to take possession of Corfu and the other islands, while the Austrians were quietly seizing upon Dalmatia and Istria, according to the secret understanding between them and the French. The treaty the French entered Venice and the old gov lished was concluded at Milan between Bona envoys of the Senate, on the 16th May, 1797, ratified by the municipal council, which was the sole authority of the state; but Bonapart ratify it, saying the municipal authority h powers for giving its sanction. On the 26th negotiating the peace with the emperor, offe a part and afterwards the whole of the Venet It was at last agreed that the emperor shoul and all the territory as far as the Adige. B to the Directory, that 'the Venetian people for liberty, and that there were no more tha crats in all Venice.' If that was the case, the justice nor reason for overthrowing by viole vernment. The definitive treaty with Austria Generals Bonaparte and Clarke on one side, Meerveldt and the Marquis del Gallo, the A potentiaries, on the other, at the village of near Udine, on the 17th October, 1797. Soo French troops evacuated Venice and the Ven of which the Austrians quietly took possession, of the Venetian democrats who had most com selves in the late change were obliged to Milan, many of them without any means of The doge Manin, the last of a long series of trates of a great republic, but a weak man the times, is said to have fallen in a fit wh oath of allegiance to Austria. He died shortly perished the republic of Venice, after an exist than a thousand years.

The authorities for the history of the fall of chiefly—Botta, Daru, the *Racolta Cronolo* parte's *Correspondence*, already mentioned; *Discorsi sulla Storia Veneta*, 1826.)

VENIE'RO, DOME'NICO, born at Venice patrician family, applied himself to literature, cially to poetry. He was a friend of Bem learned contemporaries. At the age of thirty attacked by a nervous disease which rendered valid for the rest of his life. Confined to his for many years, he found comfort in the society men who resorted thither to converse, debate, extempore poetry. These meetings were the 'Academia Veneziana,' instituted in 1558, of wh Federico Badoaro, and Paolo Manuzio were t members.

Veniero wrote a number of poems, rem their lively conceptions and power of expression di Domenico Veniero Senatore Veneziano illustrate dall' Abate Pier Antonio Serassi,' Be with a biography of the author. Veniero how dulged at times in strained rhetorical figures and He was one of the first to introduce acrostics poetry. He translated several Odes of Horace, w published by Narducci, together with translations same Roman writer by Annibal Caro, Trissino, G canti, and others: 'Odi Diverse di Orazio volg alcuni nobilissimi Ingegni,' 4to., Venice, 1605, a edition.

Veniero died in 1582. His brother Lorenzo was of the notorious Pietro Aretino, and like him wrote compositions. Maffeo Veniero, son of Lorenzo, Venice in 1550, was an elegant poet both in language and in his native Venetian dialect. tian poems are of the erotic kind, and very free the author held the dignity of archbishop of he obtained at an early age through family and interest, but it does not appear that he ever res see. He died in 1586, at the early age of thirty Among his Venetian poems, one of the most was a canzone entitled 'La Strazzosa,' or 'The Beauty,' which is a very humorous parody of Petrarch's canzoni in praise of Laura. There is obscene poem entitled 'La Zaffeta,' falsely at Maffeo Veniero, but which was published in before he was born, and, it appears, by his father (Gamba, *Collezione di Poeti Antichi nel Dialet ziano*; Haym, *Biblioteca Italiana*.) The Italian Maffeo and his brother Luigi have been insert edition of the poems of their uncle Domenico. (T *Storia della Letteratura Italiana*.)

ENI'RE FA'CIAS, or *Venire*, the name of a writ ssed to the sheriff or other returning officer, com-ling him 'to cause to come' (venire facias) the parties rth at the place named in the writ. The writ formed of the antient process used in the Exchequer against ns having privilege of parliament. It may also be oyed to cause persons to appear who are charged a misdemeanour, &c. (4 Bl., c. 24.) But the purpose hich the writ has been generally applied, and in re-ce to which it is generally known, is in summoning s to serve for the ordinary trial of civil causes.

e form on such occasions now charges the sheriff to se to come here forthwith twelve good and lawful of the body of your county, qualified according to law, who are nowise of kin either to A B, the plaintiff, or the defendant, to make a certain jury of the try between the parties aforesaid of a plea of ——, use as well the said defendant as the said plaintiff, een whom the matter in variance is, have put thems upon that jury.'

his writ is sued out, but is not acted upon, the court ming that the jurors have been summoned upon it and failed to appear at Westminster, where antiently the itself took place. At the same time another writ s, by which the sheriff is commanded to distrain their s or goods, or have their bodies, so as to compel their earance, either before the court at a subsequent day, or re the judges of assize or Nisi-prius, if they should pre-sly come into the county. This is so arranged that the ges always do previously come into the county, and the are summoned and caused to appear before them.

Tidd's *Practice*; Stephens *On Pleading*; 6 Geo. IV.,); 3 & 4 Wm. IV., c. 67.) [JURY; VENUE.]

ENLOO is a strongly-fortified town in the province of burg, in the kingdom of the Netherlands, in 51° 22′ at. and 6° 4′ E. long., on the right bank of the Maas, which there is a flying bridge connecting the town fort St. Michael on the left bank. In the Maas there fortified island called the Waert. The town has be-n five and six thousand inhabitants, part of whom are ged in the transit-trade and part in some manufac-s. It is well situated for trade, and has a convenient port, so that it serves as a depôt for merchandise from he countries on the banks of the Maas and the Rhine. loo seems to have been formerly a place of greater ortance than it is now, it having been a member of the ous Hanseatic League. In the war of the Spanish cession it was taken from the French by the allied ps under the duke of Marlborough, in 1702, which was first campaign. It was ceded to the Dutch by the ty of Utrecht. (Hassel; Cannabich; Stein.)

ENO'SA. [BASILICATA.]

ENTILA'GO, a genus consisting of only a single spe-of plants, of the natural order of Rhamnaceæ. The x is 5-parted; the corol 5-petalled; stamens 5; germ lled, hid in the crenulated flat disk; style 2-cleft. ara half superior, globose, long-winged, 1-seeded. bryo erect with perisperm. The species V. maderas ana is common in different parts of India, from the nsula to the north-western provinces; it is also found the Indian islands, as it is figured and described by mph., 'Herb. Amb.' 5, t. 2, by the name of Funis vimi-lis. It forms a large climbing shrub with stiff branches; often diœcious, with flowers having an offensive smell, unlike that of Sterculia fœtida.

VENTILATION. [WARMING AND VENTILATION.]

VENTIMI'GLIA. [SAN REMO.]

VENTRICLE. [HEART.]

VENTRICULITES, a genus of spongoid Zoophyta, pro-d by Dr. Mantell for species found in the cretaceous em, whose porous tissue is penetrated by distinct, often e foramina, arranged with more or less of regularity. triculites radiatus, Mantell, 'Geol. of Sussex,' pl. 10, V. Benettiæ, pl. 15, of the same work, are examples ently found in chalk and the flint nodules imbedded n.

VENTRILOQUISM (literally 'belly-speaking:' from *ter*, the belly; and *loquor*, I speak) is a vocal mimicry sounds, by which an illusion is produced on the hearer t the sound comes, not from the mimic, but from some her appropiate source. The various phenomena of cal mimicry may be conveniently considered under two eral heads, viz.: 1st, The simple imitation of the voices of persons, of animals, of musical instruments, and other sounds and noises of every description, in which no illusion is intended, but, on the contrary, the imitation avowedly and perceptibly comes from the mimic; and 2nd, The imitation of those voices, sounds, and noises, not as originating in the mimic, but in some other, an appropriate source at a given or varying distance, in any or even in several directions successively. And when these imitations are made without moving the mouth, features, or body, the illusive effect of the mimicry is enhanced. The terms mimicry, or imitation, are commonly adopted to designate efforts under the former general head where no illusion is intended, while the term ventriloquism distinguishes those under the latter where an illusion is produced.

The various kinds of divination amongst the nations of antiquity which were stated by the priesthood to be by a spirit, a familiar spirit, or a spirit of divination, are now supposed to have been effected by means of ventriloquism. Divination by a familiar spirit can be tracked through a long period of time. By reference to *Leviticus*, xx. 6, 27, it will be seen that the Mosaic law forbade the Hebrews to consult those having familiar spirits, and to put to death the possessor. The Mosaic law was given about fifteen hundred years before Christ. Divining by a familiar spirit was however so familiar to the Jews, that the prophet Isaiah draws a powerful illustration from the kind of voice heard in such divination, see *Isaiah*, xx. 4. In the *Acts of the Apostles*, xvi. 16, mention is made of a young woman with a familiar spirit meeting the Apostles in the city of Philippi in Macedonia. And St. Chrysostom and other early fathers of the Christian Church mention divination by a familiar spirit as practised in their day. The practice of similar divination is still common in the East, and is even practised amongst the Esquimaux. This divination by a familiar spirit has been practised upwards of three thousand years.

The witch of Endor divined by a familiar spirit; 1 *Sam.* xxviii. 7, in Hebrew אוֹב—(Ob.) The word is also adopted in the Hebrew Bible to designate those persons, whether male or female, in whom there is a familiar spirit. The plural of אוֹב is אוֹבוֹת—Oboth, which in the Septuagint version of the Scriptures is mostly rendered by the Greek 'Εγγαστριμύθους, which is compounded of ἐν, in, γαστήρ, the belly, and μῦθος, speech, and corresponds with the word ventriloquism. This rendering of the Hebrew in the Septuagint, Professor Lee accounts for by the muttering of those having a familiar spirit—the אוֹבוֹת: see his Hebrew Lexicon, or 'Thes. Heb.' Gesenii, *sub voce*.

The Greeks practised a mode of divination termed gastromancy, from γαστήρ, the belly, and μάντις, a prophet; where the diviner replied without moving his lips, so that the consulter believed he heard the actual voice of a spirit speaking from its residence within the priest's belly. St. Chrysostom adopts the same Greek word as the translators of the Septuagint version to designate the diviners by familiar spirits, viz. 'Εγγαστριμύθους.

The Septuagint rendering of the Hebrew has caused many learned theologians to doubt the actual appearance of Samuel's ghost, and to infer that the whole scene was a clever imposition on the dispirited king by the witch's skill in ventriloquy. This opinion is supported by the context. For on a careful reading of the whole narrative of Saul's interview with the witch at the opening of his campaign, compared with the events of it detailed in 1 *Sam.* xviii., and three following chapters, it may be remarked, 1st, That Saul deems the appearance, which the woman states she sees and which she describes, to be Samuel's ghost. 2nd, That it is left uncertain whether Saul afterwards saw the ghost at all. 3rd, That the reply by divination consists chiefly in oracular echoes to Saul's questions, aided by the recorded statements which he incidentally made to her. 4th, The prophetic part of the reply was but imperfectly fulfilled. The reply prophesied three distinct things, 1, That Israel with Saul was to be delivered into the Philistines' hands; 2, Saul and his sons were to die on the morrow; and 3, The army of Israel was to be delivered into the Philistines' hands (see v. 19). It is true the army was defeated, and probably nearly annihilated on their retreat, when Saul and his sons were slain. But Israel was not delivered into the Philistines' hands; the result of their conquest was, that, having defeated the army, the peaceable inhabitants fled from that district of the

Holy Land, leaving the Philistines in quiet possession of Beth-shan and its surrounding towns, where indeed they had been tolerated from the first occupation of the Holy Land by the Jews. And from all the circumstances narrated, and the localities in which they occurred, it is not easy to believe that Saul's death took place on the morrow of his interview with the witch. Thus out of three things which were prophesied, we can be certain only that one came to pass, which, in conjunction with the other circumstances, occasions doubts to arise as to the reality of the ghost's appearance, and the Septuagint rendering points to ventriloquism as the means of effecting the imposition.

The earliest description of a ventriloquial illusion in modern days is that performed by Louis Brabant, valet-de-chambre of Francis I. Louis Brabant was denied the hand of an heiress by her father. Soon after the father died, and Louis calls on the widow, determined to swindle her out of her consent by the agency of ventriloquism. Scarcely had he entered her house when she heard a well-known voice coming from on high; it was that of her deceased husband, saying, 'Give my daughter to Louis Brabant: he is rich, and has an excellent character. I am suffering a severe but just punishment in purgatory because I opposed a suitable marriage. Do what I recommend, and I then shall ascend to heaven.' Some minutes afterwards Louis Brabant, who had been waiting in an antechamber, was ushered into the widow's presence, but no one suspected that he had counterfeited the voice of the deceased. The wish from purgatory was obeyed by an immediate consent to the proposed marriage. Thus far successful, it was now indispensable for Brabant to have money at command; and he soon decided on a ventriloquial expedient for that purpose. A rich banker, named Cornu, who had acquired great wealth by unscrupulous means, and who was apprehensive of the penalties with which a future life threatened him, was thought by Brabant to be a fit person to be frightened out of some of his wealth by the agency of ventriloquy. He managed to obtain an interview, in which he adroitly turned the conversation to a future life, with its rewards and punishments; and spoke of spectres, demons, purgatory, and hell itself, when he observed the banker's countenance expressive of deep emotion. He paused, and in the interval of silence a fearful voice was heard, saying that he had come for some minutes from the fires of purgatory, where he had long been suffering, and would remain until his son terminated his penalties by an act of beneficence; adding by way of suggestion, that a large sum of money should be given to Brabant to purchase the freedom of those Christians who had fallen into the hands of the Turks. M. Cornu was much terrified, but he did not comply; and Brabant found it necessary to pay him a second visit. And now it was not only the father's voice, but also those of his deceased friends, many of whom he at once recognised, deafening him with their solicitation for his future happiness, and threatening him with the most severe punishments awaiting him if he refused to perform the act of beneficence required. All the saints of the calendar were invoked, the tumult increased, and overwhelming the banker, he gave ten thousand crowns to Brabant for the purchase; and of course the cunning ventriloquist applied the money to his own purposes.

The work of M. l'Abbé de la Chapelle, published 1772, descriptive of the feats of Baron Mengen at Vienna, and of M. St. Gille near Paris, claims attention. Baron Mengen made a doll with moveable lips, which he could control by his hand under its dress. With this doll he held witty and satirical dialogue. The author of this article saw a similar thing in the streets of London about twenty years since, in which a very sparkling dialogue was held with the doll by an itinerant ventriloquist.

Baron Mengen said he owed his art to a passion for counterfeiting the cries of animals and the voices of persons. That the passion manifested itself in early life; and that he had the power of imitating sounds so accurately as to make them appear to come from other places than his own mouth.

M. St. Gille, in 1771, made an experiment to test his ventriloquial talent before MM. Leroy and Fouchy, commissioners of the Royal Academy of Sciences, and many other persons of the highest rank. The object of the experiment was to show that M. St. Gille's mimicry of sounds was so perfect as to produce illusion. For this purpose it was reported that a spirit's voice was at [illegible] heard in the environs of St. Germain, and that the commission was appointed to verify the fact and to [illegible] the cause. All the company were in the secret [illegible] one lady, who, without suspecting it, was to be the [illegible] of the illusion. They all dined in the country in the [illegible] air, and while they were at table a voice, as of a spirit [illegible] pended in the air, addressed the lady: now it seemed [illegible] the top of the trees; then descending, it approached [illegible] then receding, it plunged into the ground, whence it [illegible] not to make itself heard. The conversation was [illegible] upwards of two hours with such adroitness that the [illegible] was fully convinced she had talked with a sylph [illegible] when the illusion was explained to her, she doubted [illegible] were an illusion.

M. St. Gille, like Baron Mengen, made no secret [illegible] art, but referred it all to mimicry, for which he [illegible] strong propensity. The French Academy adopted [illegible] views contained in the statements of these two [illegible] quists, viz., that the art consists in an accurate [illegible] any given sound as it reaches the ear.

Dugald Stewart also adopted these views and [illegible] the sanction of his great name. The phrenological [illegible] nation agrees with Dugald Stewart's (see a paper [illegible] *Journ.*, vol. i.). Adopting these views, physiologists [illegible] offered a variety of possible actions of the vocal [illegible] explain its production; and some have even [illegible] peculiarity of structure of the vocal organs [illegible] but have wisely omitted to specify what. Many [illegible] logists think that ventriloquism is vocally produced [illegible] speaking during inspiration of the breath. It is possible [illegible] speak during inspiration, and it may be [illegible] adopted; but close observation on many public [illegible] quists, and private friends who can ventriloquize, [illegible] vinces the author of this article that the general [illegible] utterance is, as in ordinary speech, on an expiration [illegible] breath.

Adopting the views of the French Academy, some [illegible] thought that the vocal means of effecting the [illegible] imitation consist in a skilful management of the [illegible] sound. Unfortunately however for this theory, [illegible] merely repeats what is already produced; and several [illegible] triloquists, including the late Mr. Mathews, have produced the vocal illusion while walking in the streets.

Baron Mengen thus describes his mode of speaking when the voice was to seem to come from his [illegible] press my tongue against the teeth, and thus [illegible] a cavity between my left cheek and teeth, in which [illegible] voice is produced by the air held in reserve in the [illegible] rynx (*gosier*). The sounds thus receive a hollow [illegible] muffled tone, which causes them to appear to come [illegible] a distance.' The Baron says it is necessary to well [illegible] the breath, and to respire as seldom as possible.

It was observed that M. St. Gille appeared [illegible] after long exertion, when the vocal illusion became [illegible] perfect. Those ventriloquists with whom the [illegible] this article has conferred have acknowledged [illegible] the chest, which they have attributed to the [illegible] slow expiration of the breath. M. St. Gille was [illegible] to cough very frequently. The ventriloquists of the [illegible] sent day also frequently cough, especially Mr. Love, [illegible] from a tickling in the throat.

Now in order to arrive at exact and positive knowledge of the modifications of voice termed ventriloquism, it [illegible] necessary to be familiar with the distinctions of [illegible] sound; and to know how the organs act in [illegible] those vocal modifications, it is necessary to know how [illegible] breath is vocalized in all its distinctions of pitch, [illegible] ness, and quality, by the ordinary actions of the [illegible] organs.

In ordinary language we speak of noise, of sound, and of musical sound; and Dr. Thomas Young adopts these terms in illustrating the mechanical causes of sound:— 'A quill striking against a piece of wood causes a noise; but striking successively against the teeth of a wheel or of a comb, a continued sound; and if the teeth of the wheel are at equal distances, and the velocity of the [illegible] tation is constant, a musical sound.' (*Lect. Nat. Phil.* [illegible]

The general terms pitch, loudness, quality, and duration embrace all the distinctions which the musician [illegible] covers in musical sounds, and which he employs in his art. The distinguishing feature of musical sound is its uniform pitch throughout its duration. And acoustically al sound is composed of an equal number of impulses oises produced in equal times. [ACOUSTICS; LARYNX; CE.]

ne general terms pitch, loudness, quality, and dura- also embrace all the distinctions heard in ordinary ds. These sounds differ from the musical in the pitch tantly varying throughout their duration, as the hu- voice in speaking, and the voices of quadrupeds. astically, such sounds are composed of an unequal ber of impulses or noises produced in equal times. from this circumstance pitch, in the strictly musical e, is not a property of ordinary sound.

ne general terms loudness and quality embrace all the nctions heard in a noise, as in the collision of two in- ic sticks. The momentary collision of the clapper ist a bell is a noise, but this mere noise is immediately wed by the ringing sound of the bell, which is a mu- sound. Pitch and duration can scarcely be con- ed as belonging to common noise. Thus we have :—

Noise, whose audible distinctions are comprehended er the general terms loudness and quality.

. Common sound, whose audible distinctions are com- ended under the general terms loudness, quality, du- n, and ever-varying pitch.

I. Musical sound, whose audible distinctions are com- ended under the general terms loudness, quality, dura- and an uniform pitch.

honation, or the production of voice, is a result of ac- s taking place under two distinct classes of laws, viz.: he ordinary mechanical laws of acoustics; and, 2, The siological laws of muscular movement. The adjust- t of the vocal mechanism to be acted on by the cur- of air is made by actions under the latter laws; and ation is the result of the re-action of the mechanism e current of air, by mechanical movements under the er laws. [LARYNX; STAMMER.] The pitch of the e essentially depends on the tension of the vocal liga- ts: the loudness on the extent of excursion of the l ligaments in their vibration; the duration on the inance of the vocalizing causes; and the quality on organization of the larynx, and also on the form and of the vocal tube. Now the form and size of this tube be altered in various ways, as by dilating or contract- the pharynx [PHARYNX]; by dilating or contracting mouth [MOUTH]; by contracting the communication veen the pharynx and mouth so as to make them dis- t chambers, or by dilating the opening so as to throw n into one, which is chiefly effected by movements of soft palate; by altering the form of the mouth's cavity, ch is produced by varying the position of the tongue. ill be found that each of these modifications of the al tube confers a peculiarity of quality to the voice. these however are vocal or laryngeal sounds.

ounds can be produced in the vocal tube apart from larynx. These are not vocal sounds. Some of them ever may be of a definite and uniform pitch, while rs are mere noises, as rustling, whispering, gurgling, stling, snoring, and many others.

ow as every audibility comes under the classes of se, sound, or musical sound, and as each variety under se classes is producible by the vocal apparatus of man, is an obvious conclusion that an ordinary vocal appa- us is all that is required to vocalize the mimetic con- ptions of the ventriloquist. A larynx capable of pro- cing a larger compass of voice than another has a greater ge of pitch within its power of imitation.

A person having an ear acutely perceptive to the nice tinctions of sounds may, by a little practice, imitate ny sounds with accuracy. Those persons however who highly endowed with the mental requisites, which con- t of an intense desire to mimic coupled with the ability originate mimetic ideas, are able to imitate sounds at t hearing, and without previous practice. Passing from imitation of sounds, as that of knife-grinding, sawing d planing wood, the voices of animals and men, we pro- ed to treat of those illusions where the voice so per- tly counterfeits the reality intended, that it appears not issue from the mimic, but from an appropriate source, whatever direction and at whatever distance that source y be. The essence of ventriloquy consists in creating lusions as to the distance and direction whence a sound s travelled; which are thus explained :—

I. *Distance.* We do not hear the distance which a sound has travelled from its source, but we judge the distance from our former experience, by comparing the loudness which we hear with the known distance and known loudness of similar sounds heard on former occasions. Common experience will confirm, that we oftener err in estimating the distance of uncommon than of familiar sounds. In apology for such an error the ordinary language is, 'It seemed too loud to come so far,' or 'It seemed too near to be so faint a sound,' as the case may be. Both of which are apologies for an erroneous judgment, and not for hearing.

Near sounds are louder than distant ones. Now by preserving the same pitch, quality, and duration, but with an accurately graduated reduction of loudness, a series forming a perspective (if the term be allowable) of sounds may be created, which, falling in succession on the ear, will suggest to the mind a constantly increasing distance of the sound's source. In this way Mr. Love, with great ability, produces an imitation of a receding watchman crying the hour so perfect as to appear a reality.

An effort of a similar character, but in which the source of sound is approaching, is produced at the theatre in the representation of Macbeth. A military band is faintly heard, which gradually increases in loudness, suggesting to the mind the approach from a great distance of the victorious army of Macbeth, until the ordinary degree of loudness suggests its proximity, when the army immediately comes upon the stage.

Loudness is a property of sound which has not yet had justice done to its importance in the schools of music and elocution. Its nomenclature is vague and meagre, and it can scarcely be said to have a notation. The author of this article has observed that one of the high excellencies which singers of genius have snatched beyond the rules of art has been a skilful management of the degrees of vocal loudness, and a nice adaptation of them to aid the melody in expressing the intended feeling. The varieties of loudness remain still unmeasured, and the abrupt transitions in loudness made by musical performers suggest that these distinctions are ill perceived. It is true that the total effect of a graduated series or scale of loudness is popularly felt, as in the cited illusions of Mr. Love and the Macbeth march; but besides feeling this general effect, he, whose ear is sensitive to minute degrees of loudness, perceives also the close relationships of those degrees to each other, just as the musician perceives the successive intervals of pitch of which a melody is composed.

The estimate then which is formed of the distance which a sound has travelled before reaching the ear is a judgment of the mind formed by comparing a present perception (by hearing) with the remembrance of a former loudness in connection with its known distance.

II. *Direction.*—The direction whence a sound comes seems to be judged of by the right or left ear receiving the stronger impression, which however can only take place when the sound's source is in a plane, or nearly so, with a line passing through both ears. It is familiarly known that a person in a house cannot by the noise of an approaching carriage judge with certainty whether it is coming from the right or left. He accurately judges it to be approaching, passing, or receding, as the case may be, by the gradations of loudness, but is unable to decide with certainty whether its approach or recession is from up or down the street. Common experience shows the judgment to be more fallible concerning the direction than the distance of sounds. Professor Mueller of Berlin states in his 'Physiology' that Venturini's experiments, detailed in Voigt's 'Mag.,' bd. ii., demonstrate the impossibility under certain circumstances of estimating whence a sound comes to the ear. Now without entering upon the merits of those valuable experiments, enough has been above stated to show that we do not hear, but that we judge, the direction a sound has travelled from its source on reaching the ear.

It has been remarked, and the writer of this article confirms its truth from observations made both in public and in private ventriloquy, that the ventriloquist indicates either directly or indirectly the direction which he wishes his audience to believe the sound is coming. Thus they directly indicate it by words, such as—'Are you up there?' 'He is up the chimney.' 'He is in the cellar.' 'Are you down there?' &c. And they indirectly indicate it by some suggestive circumstance, as an action or gesture which is so skilfully unobtrusive and natural as to effect its object without being discovered. Thus, when the ventriloquist looks or listens in any direction, or even simply turns towards any point, as if he expected sound to come thence, the attention of an audience is by that means instantly directed also to the same place. Thus, before a sound is produced, the audience expect it to come in the suggested direction. And the ventriloquist has merely by his adjustment of vocal loudness to indicate the necessary distance, when a misjudgment of the audience will complete the illusion which he has begun.

The effect which is produced on sound by its travelling from a distance is observed to be—

1. That its loudness is reduced in proportion to the distance.
2. That its pitch remains unaltered.
3. That its quality or tone is somewhat softened.
4. That its duration remains unaltered.
5. That human speech is somewhat obscured, chiefly in the consonant sounds.

Now the ventriloquist imitates the sound, not as it is heard at its source, but as it is heard after travelling from a distance. A skilful ventriloquist can effect his imitations without much movement of his lips and features. Now it has been observed, that ventriloquists during their efforts turn the front face away from the audience and scarcely even show the profile. The author of this article confirms this observation as far as regards moderate-sized rooms, but he has seen the front face in a theatre.

It is quite easy to speak without moving the jaw, and it is the jaw's movements which disturb the features in utterance. Now the labial sounds, as B, P, M, when the jaw is thus fixed, can be made with a slight movement of the lips. The lips and jaws being always somewhat open during ventriloquy, a slight labial movement remains unnoticed, unless special attention be directed to it; and all the modifications of voice can be produced without at all distorting the features or moving the lips.

The preceding outline of the philosophy of ventriloquism is sufficient to exhibit the nature of the art. To enter upon the consideration of all the vocal means adopted to accomplish the various imitations would fill a volume. The mode of counterfeiting variations in loudness by changes of pitch, and also by changes from the natural to the falsetto register of voice, are amongst the wonders of vocal science, and are capable of extensive application by the scientific ventriloquist.

VENUE (from *vicenetum*, *visne*, 'neighbourhood'). The county in which the trial of a particular cause takes place is said to be the Venue of that cause. Antiently the office of a jury was to act upon the knowledge which as neighbours of the parties they happened previously to possess [JURY]; and it was therefore necessary that they should be summoned from the neighbourhood of the places at which the facts disputed between the parties to the cause were said to have occurred. In order that a proper Venire might issue to the sheriff for such purpose, the place in which the action was brought was stated in the margin of the declaration, and on the statement throughout the pleadings of any issuable fact a statement was also made of the place at which such fact was alleged to have occurred. This was done with such particularity, that not only the name of the county, but even of the parish and of the hamlet was inserted. As to all such facts upon which issue was taken, a venire was sued out applying to each different place. The sheriff returned jurors from that place, and by those jurors the facts were decided, so that antiently several distinct Venires and trials might be necessary to dispose of the issues in one action. By degrees juries ceased to act upon their own knowledge, and applied themselves to their present duties of deciding upon the statements of witnesses. The necessity therefore ceased for summoning them from the particular part of the county, and the practice gradually declined, till, at last, the form of the Venire still continuing the same, two jurors from the same hundred only were required for the trial of a personal action. By the stat. 16 & 17 Car. II., c. 8, it was enacted that no error should be brought, because there was no right Venue, provided the cause was tried by a jury of the proper county or place where the action was brought. After this statute the practice was established of trying all the issues by the jury of the general Venue in the action. By 4 Ann. c. 16, it was further enacted that 'every Venire facias for the trial of any issue shall be awarded of the body of the proper county where such issue is triable:' that is, from the county at large, without reference to the particular hundred containing the place laid as Venue; and such is still the practice. By a general rule of all the courts, of Hi[illegible] Term, 4 Wm. IV., it is ordered, that 'In future the [illegible] of a county shall in all cases be stated in the margin of the declaration, and shall be taken to be the Venue [illegible] by the plaintiff, and no Venue shall be stated in the body of the declaration, or in any subsequent pleading.'

Originally with respect to all actions the same strictness of Venue was held necessary, as there was the same reason for all. After however the jury began to confine themselves to their present functions, a distinction was established between local (that is, actions relating to [illegible] estate) and transitory (that is, actions of debt, contract, personal injuries, &c.). In regard to the former, [illegible] held that the actual place in which the subject-matter [illegible] situated must be laid as the Venue in the action, and [illegible] rule still prevails. The reason is said to proceed from the circumstance that, unless the action were brought [illegible] actual county, the sheriff of the county would be unable to give effect to the judgment in the action. In [illegible] actions, on the contrary, the subject-matter of [illegible] held not to have any fixed place, but to attend, as [illegible] upon the person of the parties interested, a discretion [illegible] vested in the plaintiff to bring his action in any [illegible] which he pleased. As a consequence of which it [illegible] that though the cause of action has occurred even [illegible] the kingdom, it is still open to the plaintiff to [illegible] action in the courts of this country. This discretion [illegible] remains to the plaintiff in a transitory action. [illegible] courts assert an authority upon application made to [illegible] of changing the Venue. This is done upon its being [illegible] to appear that great inconvenience would arise from [illegible] ing in the original county, because the body of the [illegible] dence lies in another, or because from local prejudice [illegible] fair trial cannot be had, &c. And the same authority [illegible] exercised even in local actions in spite of the technical difficulty which has been before referred to. (3 Bl. Com. 294, 384; Stephens *On Pleading*, c. ii., s. 4, v. 1; [illegible] NIRE FACIAS.]

In criminal trials the Venue is the county in which the offence charged was actually committed; being a grand jury of that county the indictment must be preferred, [illegible] before a petty jury the trial had. The courts however have the same discretion as to the power of changing [illegible] Venue as in civil cases. Moreover, as to criminal [illegible] many exceptions have been introduced by various statutes. These exceptions more properly belong to the heads [illegible] the various offences to which they apply. A few [illegible] here mentioned:—Offences committed within 500 [illegible] of the boundary of counties may be tried in any of them, and a party stealing or feloniously taking goods [illegible] county and carrying them into another may be indicted [illegible] either: so also, if goods are stolen during a journey [illegible] voyage, the Venue may be laid in any county [illegible] which the vessel or carriage has passed. A receiver [illegible] be tried either where he has actually received the [illegible] or where the principal may be tried. Offences committed in counties of cities may be tried in the adjoining [illegible] (Archbold, *Pl. and Ev. in Cr. Ca.*; b. 1, pt. 1, c. [illegible]

VENUS. The name of the planet which is nearest [illegible] the earth, and, except Mercury, nearest to the Sun. The principal point of its physical description is the distinctness with which its phases are seen through a telescope, in which it exhibits all the changes of appearance which are, to the naked eye, characteristic of nothing but the moon. With regard to these phases, there is a remarkable historical error which we cannot trace higher than Dr. Smith's Optics, but which has been copied by Hutton and others. It is said, 'When Copernicus revived the ancient Pythagoric system, asserting that the earth and planets moved round the sun at the centre of *their orbits*, the Ptolemaics objected, if this were true, that the phases of Venus should resemble those of the moon. Copernicus replied, *that some time or other that resemblance would be found out*.' (Smith's *Optics*, p. 415.) Now, first, Copernicus never answered an objection to his system in the manner implied in the story; for he literally only lived to lay his hand upon a copy of his own work, and never opened it. [COPERNICUS, p. 501.] Secondly, Gassendi, his her, in stating the verification of his system (as he s it) derived from these phases, never alludes to any prophecy: nor does Galileo, in announcing the scopic discovery of the phases of Venus (A.D. 1611), in giving praise to Copernicus and Kepler for not ng abandoned the motion of the earth on account of difficulty arising out of the apparent want of them, suppose that Copernicus, or any of his followers, had slightest idea of that apparent want arising from imection of vision. Thirdly, Copernicus himself, in tioning the difficulty, expressly meets it by the supstion that Mercury and Venus, the 'stellæ' alluded to ie coming quotation, either shine by their own light, re completely saturated with the solar rays: 'Non ergo mur in stellis opacitatem esse aliquam, lunari similem, vel proprio lumine, vel solari totis imbutas corporibus ere, et idcirco solem non impedire' (lib. i., cap. 10). the objection itself has nothing to do with the difnce between the system of Copernicus and that of lemy, for it had long before been raised against the er: all, in fact, who maintained that the orbit of Venus es between the earth and sun having to meet it in way or another, whether they made the earth or the the centre of their system.

the theory of the motion of Venus, the most remark- circumstance is the *long inequality* discovered some rs ago by Mr. Airy, depending upon the earth. [GRAATION, p. 391.] A satellite was at one time suspected belong to this planet, but no such thing has ever been ected. It may be remarked that the satellite of an rior planet might not be easy to find, if it were very ll: for when the planet is nearest the earth, and cirstances most favourable for its discovery in other ects, the dark side would be turned towards the earth. ugh in the earlier period of telescopic observations, ts of various sorts were detected on the disc of Venus, the general description of its appearance in our day, as en by Sir J. Herschel, is as follows: 'Although it sionally attains the diameter of 61″, which is larger that of any other planet, it is yet the most difficult of all to define with telescopes. The intense lustre of lluminated part dazzles the sight, and exaggerates y imperfection of the telescope: yet we see clearly its surface is not mottled over with permanent spots the moon; we perceive in it neither mountains nor dows, but a uniform brightness, in which sometimes may indeed fancy obscurer portions, but can seldom ever rest fully satisfied of the fact. The most natural clusion, from the very rare appearance and want of manence of the spots, is, that we do not see, as in the on, the real surface of this planet, but only its atmoere, much loaded with clouds, and which may serve to igate the otherwise intense glare of its sunshine.'

enus, like Mercury, from the orbit being entirely within t of the earth, is never at more than a certain angular tance from the sun: her greatest angular distance, or ngation, being from 45° to 47° 12′. Her mean apparent meter is 16″·9, but varies from 9″·6 to 61″·2. The diameter is ·975 of that of the earth, or about 7700 les, and the volume is ·927 of that of the earth. The sity is very nearly that of the earth; but this element, also the mass, is rather uncertain. The mass of this anet is stated by Laplace at 1-356354th of that of the n, but later writers give 1-405871th as more probable. cently Mr. Rothman (*Mem. Astron. Soc.*, vol. xii., 409-415) has shown strong reasons for supposing that mass given by Laplace has been too much diminished his successors, and that the second fraction above named uld be increased by about its tenth part at least, and bably by more. The most uncertain of all the results the theory of gravitation is the mass of a planet which s no satellite.

This planet revolves on its axis in about $23^h\ 21^m\ 7^s$, ough this, owing to the absence of definite spots on its sc, can hardly be considered as very accurate. Its ght and heat are to that of the earth as 1911 to 1000.

The elements of the orbit of Venus, which are usually ken from Lindenau's Tables (1810), have lately underne a searching examination by comparison with seven ars' observations made at Greenwich. Messrs. Main and aisher, who made this examination, have given their n resulting elements, compared with those deduced for eir own epoch, from the above-mentioned tables. In the following list we have adopted the new elements, placing the old ones after them in parentheses; but taking the secular variations entirely from those given as the result of the investigation just quoted (*Mem. Astron. Soc.*, vol. xii.). The semiaxis major alone remains untouched; for though the examiners found reason to suspect that it was somewhat in error, they did not feel able to decide with certainty as to the amount of the alteration.

Elements of the Orbit of Venus.

Epoch 1836, January 1, 0^h mean astronomical time at Seeberg ($42^m\ 56^s$ east of Greenwich).

Semiaxis major ·7233316, that of the Earth being assumed as the unit.

Eccentricity ·00684568 (·00682265); its secular diminution (or diminution in 100 years) ·00008200.

Inclination of the orbit to the ecliptic 3° 23′ 34″·34 (3° 23′ 31″·11); its secular increase 10″·035.

Longitudes from the mean equinox of the epoch (1.) of the ascending node 75° 12′ 3″·60 (75° 12′ 25″); its secular increase (combined with the precession) 3095″·23: (2.) of the perihelion 129° 15′ 3″ (129° 11′ 18″); its secular increase (combined with the precession) 49″·62; of the planet (mean) 332° 1′ 35″·23 (332° 1′ 33″·1).

Mean sidereal motion in 365¼ days 2106641″·49; sidereal revolution 224·7007869 mean solar days.

When Venus is to the west of the sun she rises and sets before him, and was then called Phosphorus and Lucifer by the antients; but when she is to the east of the sun she rises and sets after him, and was then called Hesperus. The old terms of our almanacs, 'Morning-star' and 'Evening-star' have reference to these positions.

VENUS, TRANSIT OF. [TRANSITS OF MERCURY AND VENUS.]

VENUS (Malacology). [VENERIDÆ.]

VENUS DE' MEDICI. This celebrated relic of antient art stands in the apartment of the Imperial Gallery at Florence, which is called the Tribune (Tribuna). It is said to have been found in the villa of Hadrian, near Tivoli, in eleven pieces, and was some time afterwards carried to Florence in the pontificate of Innocent XI., about the year 1680. It is all antient, with the exception of the right arm, the lower half of the left arm, some small piecings about the statue and its accessaries, and the plinth. On the plinth is inscribed the name and country of the artist who made the statue: Cleomenes, the son of Apollodorus, of Athens—ΚΛΕΟΜΕΝΗΣ ΑΠΟΛΛΟΔΩΡΟΥ ΑΘΗΝΑΙΟΣ ΕΠΩΕΣΕΝ. This inscription was copied from that of the original plinth, which was broken. Its authenticity has been questioned, but Thiersch is of opinion that it is genuine; and he has fixed the period of Cleomenes, for various reasons, to be about 200 years B.C., or certainly before the destruction of Corinth, B.C. 148. Flaxman also judges from its style that it was made after the time of Alexander the Great, and he seems to have considered it a copy of the celebrated Venus of Cnidos, by Praxiteles, an opinion expressed by many other critics, but apparently without sufficient grounds. Neither the time nor place of its discovery is positively known, but it stood in the sixteenth century in the Medici Gardens at Rome: the forum of Octavia at Rome is also said to have been the place of its discovery. It was taken by the French to Paris, but was restored to Florence in 1815.

It is a small figure, four feet eleven inches and a half high without the plinth; is of Parian marble, and stands upon the left leg, which is strengthened by a dolphin with its head downwards, upon which two little Cupids are sitting, called Eros and Anteros. The statue is of small but beautiful proportions, and all the parts are exquisitely rounded, but the face has little expression and not much beauty. The ears are pierced, and at one time bore ornaments; the hair was gilded, and on the upper part of the left arm there is the mark where probably a bracelet was fixed. Winckelmann considered the head of this Venus a portrait; and he mentions a Venus formerly in the possession of Thomas Jenkins, an English painter at Rome, which surpassed, in his opinion, this Venus in every respect. Jenkins was a scholar of Hudson, and went to Rome with Wilson, but he turned banker and dealer in antiquities there. There is apparently no clue by which this Venus might be traced to its present possessor, except perhaps that Jenkins was the friend and companion of Gavin Hamilton, and took part in his excavations.

(*Museum Florentinum*; Thiersch, *Ueber die Epochen der Bildenden Kunst unter den Griechen*; Winckelmann, *Geschichte der Kunst des Alterthums*.)

VENUSTI, MARCELLO, a celebrated painter of the sixteenth century, born at Mantua. He studied in Rome under Perino del Vaga, for whom he executed many works. He was selected by Michael Angelo to paint a small copy in oil of his Last Judgment, in the Sistine Chapel, for the Cardinal Farnese, and he executed it so entirely to the satisfaction of Michael Angelo, that he gave him many other designs to paint. This excellent picture of the Last Judgment is now in the Royal Museum at Naples: there is a copy of it in the Aguado Collection at Paris. Venusti painted many pictures for various churches in Rome; Baglione has given a long list of his works: but he acquired a greater reputation by his pictures from the designs of Michael Angelo. He died at Florence, in the pontificate of Gregory XIII. (1572-1585). (Baglione, *Vite de' Pittori*, &c.)

VERA CRUZ, a seaport and commercial town in the United Mexican States, is situated in 19° 11′ N. lat. and 96° 8′ W. long., on the south-western shores of the southern part of the Gulf of Mexico. It is still the most important commercial town of the republic, though it has properly speaking no harbour, but only a roadstead formed by several shoals, which enclose in a semicircular form a tract of sea which in many parts offers good anchorage. These shoals break the swell, which is always considerable in the Gulf of Mexico, especially during the Nortes, or northerly winds, but do not protect the anchorage against the effects of these gales. The largest of the shoals, called La Gallega, lies opposite the town; and at its western extremity is a rocky island, on which the fortress of St. Juan de Ulua is built. The strait which separates the fortress from the town is less than 700 yards wide, and about 1000 yards long. This strait properly constitutes the harbour of Vera Cruz, as it is better protected against the swell of the sea and against the furious nortes than any other part of the anchorage. Large vessels however must anchor near the fortress, as the water is very shoal near the town. In the rocks on which the fortress stands iron rings are fastened, by which the largest vessels may be secured against being driven away by the nortes. During the War of Independence, when the Spaniards were in possession of the fortress, and vessels could not enter the harbour, they anchored about four miles south of the town, in the strait between Punta Mocambo and the Isla de Sacrificios; but this anchorage is far from being so good as that under the cannons of St. Juan de Ulua. Vera Cruz is always dangerous to navigators. From October to April the shipping is exposed to the nortes, which blow with incredible violence: the air is filled with sand, and the sky darkened with clouds; whilst the waves are driven with such impetuosity on the beach, that the whole line of coast is one sheet of foam. All communication between the shipping and the town is suspended, even when vessels are at anchor under the walls of the castle; but these gales purify the atmosphere, and seem to remove the causes of the vomito prieto, a kind of yellow fever, which, during the summer (from April to October), proves so fatal to foreigners along the whole eastern coast of the Mexican States.

Vera Cruz is built on a level and arid shore, consisting of sand, and almost entirely destitute of vegetation. At the back of the town are sand-hills, which, it is supposed, owe their origin to the gales of the nortes. They rise from 25 to 36 feet above their base, and are composed of sand so fine and loose, that they annually change their form and position. The high temperature which these sand-hills acquire in summer, and the reflection of the solar rays from them, are considered the principal causes of the great heat experienced in the town at that season of the year. During five months of the year, from May to September, both inclusive, the mean temperature of Vera Cruz is 81°·5, or somewhat higher than the mean annual temperature of the equator. During three of these months (July to September) the rains are very abundant. In the other months the mean temperature is lower: in December it does not exceed 70°, which is only 7° above that of the month of July in London. The annual quantity of rain varies between 90 and 96 inches, and in the month of July alone the quantity which falls amounts to two-thirds of that which falls in London all the year round.

Vera Cruz is enclosed by walls, which surround the town so completely, that the free circulation of air is impeded, which circumstance is considered one of the causes which increase, if not create, the dangerous disease which annually commits such havoc. The streets are straight and wide: the paving is very good, and every street has a raised footway on each side, of a convenient breadth and peculiar construction. A ledge of cut stones bounds the intended path, and the space between it and the houses is filled with a fine cement of lime, sand, and shells, which equals stone in hardness and durability, and acquires a polish from the feet of passengers. Many of the houses are excellent, and erected at great expense, on account of the scarcity of materials: a belt of sand which stretches between the city and the interior prevents the transport of stone or bricks. All the houses are constructed of a porous white coral, which composes the cliffs on the coast, and is usually found in large rounded masses. The houses are all flat-topped and covered with cement, and these serve to receive the rain-water for the tanks, or algibes, with which every good house is furnished, and which hold sufficient water for two or three years' consumption. The public buildings are not distinguished by beauty. There are several hospitals.

It is generally supposed that Vera Cruz is almost destitute of water, but that is not the case. Water is found at a depth of from 3 to 4 feet; but it is very bad, being derived by filtration from the sea or from some small lakes among the sand-hills. It is only used for washing. The common people use the water brought by the lower classes by an aqueduct almost buried beneath the flat soil, from the Laguna, a lake about 6 miles distant from the town. The water collected in the tanks is much better.

Humboldt stated at the beginning of the present century the population at 16,000; but in the War of Independence this place suffered more than any other, as the Spaniards kept possession of the castle of St. Juan de Ulua to the 18th of November, 1825; and two years after its termination it was found that the population had been reduced to 8000 individuals. Since that time the town has gradually recovered part of its former population; but as it has lost some of its commerce, it is probable that even now the population does not exceed 12,000 inhabitants. Before 1820 Vera Cruz was the only port on the eastern coast of Mexico from which the produce of the country was exported, and by which foreign goods destined for the consumption of the interior reached their destination. At that period the value of the articles exported amounted to 21,700,000 and those imported to 14,650,000, Spanish dollars. [MEXICAN STATES, vol. xv., p. 163.] But soon after 1820 other ports of the country were thrown open to the foreign trade, and since that time many of its productions, especially the produce of the northern mines, have found their way to other ports, especially to Tampico. Vera Cruz however serves still as an outlet for the produce of the mines situated south of 21° N. lat., and of all the commodities destined for the markets of Europe and the United States of North America: it also exports the tobacco, sugar, and coffee which are grown in the plain between the Gulf of Mexico and the table-land of Anahuac, with the jalap, vanilla, and sarsaparilla which are collected mostly on the declivity of the table-land. It is probable however that all these articles taken together do not much exceed the sum of 7,000,000 Spanish dollars, and hardly amount to one-third of the sum at which its exports were valued before 1820. The imports however have not decreased in the same proportion, as the greater part of the table-land and even some tracts along the Pacific, are supplied with foreign goods from the capital, which receives them by the way of Vera Cruz, which town therefore must be considered as the port of the city of Mexico.

The island on which the castle of St. Juan de Ulua is built was visited for the first time by Europeans under the command of Juan de Grixalva in 1518, and in the following year Cortes landed his army at the place where the town now stands; but the town founded by him, and called Villa Rica de Vera Cruz, was some miles farther north. After three years that place was abandoned, and another town was built a little farther south, at a place still called Antigua, to distinguish it from the present town. The situation also was found inconvenient, and the present town was built towards the close of the sixteenth century, but it was not incorporated before 1615.

Humboldt's *Essai Politique sur le Royaume de la Nou- e Espagne*; Lyon's *Journal of a Residence and Tour he Republic of Mexico*; and Ward's *Mexico in 1827*.)

ERA PAZ. [Guatemala.]

'ERAGUA. [Panama.]

'ERANDA, or VERANDAH. A sort of light external ery with a sloping roof of awning-like character, sup- ted on slender pillars, and frequently partly enclosed in it with lattice-work. The veranda is both of Eastern ne and Eastern origin, and appears to have been first in- luced into this country towards the end of the 18th cen- . As here applied however, it is a mere excrescence in gn, assimilating with no one style practised by us, and so tolerable only for small villas and cottage residences, re no style is attempted, and where it affords a cheap stitute for a colonnade, providing shelter against rain sun, and a dry walk, or seat *al fresco*, attached to sitting- ns on the ground-floor. In street architecture, verandas ched to the first-floor of houses have nothing on the e of beauty and very little of convenience to recommend m: while they seem to encumber the fronts with a sort rojecting cage, they are necessarily so shallow, as to be ttle other service than for setting out plants, except it hat of screening the room within. A far more archi- ural and ornamental appearance might be given to ve- las than has hitherto been done: their roofs might be ted in imitation of striped and figured awning, and e little variety of colour be introduced elsewhere. ere the house itself partakes of Gothic, the veranda ght easily be accommodated to the same style, some- t in the character of the framing and carving of what termed half-timbered houses.

ERATRIA, a vegetable alkali prepared from Ceva- , the seed of the *Helonias officinalis*. It was dis- red by Meissner in 1818, and obtained by Pelletier Couerbe in 1819.

eratria is a white or greenish-white powder, which has ky and crystalline appearance under the microscope; inodorous, very acrid and poisonous. It is insoluble ater and alkaline solutions; very soluble in alcohol sparingly in æther; the solution when evaporated osts transparent laminæ. The solutions have the line property of restoring the blue colour of reddened ns.

he salts of veratria are neutral, and have a slight styptic ; the hydrochlorate crystallizes in short needle-form tals, which are very soluble in water and alcohol; the hate crystallizes in quadrilateral prisms; concentrated c acid renders veratria first scarlet and then yellow; entrated sulphuric acid gives it at first a yellow colour, rwards a blood-red, and eventually violet.

eratria is composed of—

Twenty-two equivalents of hydrogen .	22
Thirty-four equivalents of carbon .	204
Six equivalents of oxygen . . .	48
One equivalent of azote . . .	14
Equivalent . . .	288

'ERATRIC ACID, the acid with which veratria s combined in Cevadilla. It crystallizes in short ms, which are transparent and colourless, and slightly r to the taste. It is slightly soluble in cold water, but e soluble in hot, and readily dissolved by alcohol, but at all by æther.

either concentrated nitric nor sulphuric acid decom- s veratric acid, but a mixture of them renders it ow. When heated to 212° the crystals lose water, and become of a dull white colour; at a high tempera- they melt into a colourless liquid, and sublime with- leaving any residue. It is composed of—

Nine equivalents of hydrogen . .	9
Eighteen equivalents of carbon . .	108
Seven equivalents of oxygen . .	56
Equivalent . . .	173

he crystals contain one equivalent of water. Veratric l forms crystallizable salts with the alkalis, which are y soluble in water and alcohol. Their solutions pre- itate the salts of lead and silver, and the veratriate of latter is white, and slightly soluble in alcohol.

'ERATRUM, a genus of plants belonging to the ural order Melanthaceæ. The name Veratrum occurs h in Pliny and Lucretius, but whether these were the same plants as the modern genus it is now impossible to say. It is also supposed to be the ἐλλέβορος λευκός of Dioscorides; and the name White Hellebore, which is given to one of the species, seems to confirm this view. The genus is characterised as follows:—Perianth composed of six permanent, sessile, equal parts, to which are attached 6 stamens; styles 3, permanent, with simple spreading stigmas; capsules 3, bursting at their inner margins, by which they are originally united; seeds numerous, compressed, imbricated, winged at each end: several of the flowers have only the rudiment of an ovary.

V. album, Common White Hellebore, has a thrice-compound panicle with ascending elliptical pieces of the perianth; the bracts of the branches oblong, partial, as long as the downy peduncle. It is a native of moist alpine meadows in the southern, central, and northern parts of Europe, but is not a native of Britain. In company with the *Gentiana lutea* it is one of the most prominent features in the rich pastures of the Alps of Switzerland and Savoy. The stem, which is from two to four or five feet in height, proceeds from a black, fleshy, wrinkled fusiform rhizoma, or rootstock, which is beset with a number of small radicles. [Veratrum album—*Medical Properties of.*]

V. viride, Green-flowered Veratrum, has panicled racemes, with the bracts of the branches oblong-lanceolate, partial, longer than the downy petiole. This is a North American species, and is found in swamps and bogs from Canada to the Carolinas. It is found, according to Dr. Bigelow, in the swamps around Boston, where it is called Poke-root, or Swamp Hellebore.

V. nigrum, Dark-flowered Veratrum, has dense cylindrical panicled racemes with the bracts of the branches linear-lanceolate and very long, pieces of the perianth obovate, widely spreading, and at length reflexed. It is a native of dry mountainous situations in Siberia, Hungary, Austria, and Greece. It will grow freely in gardens in Britain, especially in a light soil.

V. virginicum, Virginian Veratrum, has loose panicled racemes with bracts shorter than the peduncle, and pieces of the perianth with two glands at the base. It grows amongst luxuriant herbage in low grounds from New York to the Carolinas. It is a hardy plant, and may be grown in gardens in Britain. The perianth is at first of a green colour, with two brown spots on each piece: it afterwards turns to a red-brown colour.

V. Sabadilla, Caustic Veratrum, at one time supposed to yield the Cevadilla of commerce, and from which the poisonous alkaloid veratrine of the Pharmacopœia is directed to be prepared, has broad ovate, plantagineous leaves, dark purplish-black flowers, and capsules situated on only one-half of the circumference of the stem. This plant appears to be a native of the West Indies and Mexico, from whence also the true Cevadilla plant comes to this country. The true Cevadilla plant has been stated to be, by David Don, the *Helonias officinalis*, and more recently, by Lindley, *Asagræa officinalis*. Previous to this however Schiede, who travelled in Mexico, sent home specimens of plants of Cevadilla, agreeing more with Veratrum than any other genus, and which Schlechtendal named *Veratrum officinale*. Dr. Christison, after an examination of the fragments of racemes, which occur in commerce as Cevadilla, is inclined to think that Schiede's plant supplies the greatest quantity to the market, although it is not improbable that this and several allied species are frequently substituted for one another, as the quantity of Veratrine they contain is much the same.

In the cultivation of the species of Veratrum, they may be propagated by dividing their roots or sowing seeds. When the former method is adopted, the larger roots should be selected, and they should be planted out in the autumn in a light dry rich soil. When propagated by seeds, they should be sown in the spring in a bed or border of light earth or in a box, and the plants should be put out when the leaves decay in the following autumn.

VERATRUM ALBUM (White Hellebore)—*Medical Properties of.* Of this, two varieties, or distinct species, are officinal: one termed V. album; the other V. album β, or Lobellianum. This last prefers a chalky soil; the plants occur in the meadows of the Swiss Alps, the Pyrenees, the mountains of Austria, and in Siberia. The rhizomas of both kinds are collected indiscriminately. This part occurs single, double, or many-headed, in cylinders, or pyramidal pieces, from two to four inches long, and from three-quarters to two inches thick, rough, wrinkled, of a greyish-black colour externally, but of a yellowish-white within. Some root-fibres, intermingled with slender flexible radicles, adhere to it; and on the upper part are found the scales, or withered remains of former leaves, which from their tunicated appearance have led some writers to describe it as a bulb. This, though incorrect, is useful to remember, as a good discriminative mark between it and other plants confounded with it, which, having *roots* and not *rhizomata*, are devoid of this character. A transverse section presents a large central portion, sometimes termed the medulla; and, according to the age of the specimen, one, two, or more external circles, bounded by the dark-brown epidermis. The rhizoma is nearly devoid of odour, but has an acrid, bitter, burning taste. It is easily powdered, but the person engaged in powdering it should wear a mask, as it excites a heat, an eruption of the skin, and any drawn up the nostrils causes violent sneezing and inflammation of the Schneiderian membrane: hence its German name of *nieswurzel*. By time the acridity and activity are diminished, so that old specimens become not only mouldy, but of inferior strength, and should be rejected.

The chemical analysis by Pelletier and Caventou ('Annal. de Physique et de Chimie,' xiv., p. 81) shows that it consists of fatty matter (composed of elain, stearin, and a volatile, not crystallizable, acid (cevadic?), supergallate of veratria, yellow extractive-like colouring-matter, gum, starch, and woody fibre. In addition to these, Simon has discovered a new vegetable principle which he terms *jervin*. (See 'Lond. and Ed. Philos. Mag.,' vol. xii. p. 29.) White hellebore is an agent of great and dangerous power. According to the experiments and inquiries of Schabel ('Dissertatio de eff. Veratri albi et Hellebori nigri,' Tübingen, 1817), it is poisonous to all classes of animals, and acts fatally, if in sufficient quantity, by whatever way it is introduced into the system. It appears to have a specific effect on the intestinal canal and nervous system, its effects on these parts being uniform, whether applied directly to them or to remote parts, provided absorption take place. The action is that of a narcotico-acrid poison; but its narcotic effect is less, while its acrimony is greater, than that of black hellebore. It is doubtful whether the plant now spoken of is the *white hellebore* of the antients. In doses short of any dangerous or violent effect, white hellebore exercises a peculiar action on the secreting organs, the stomach and intestines, and the nervous system. Almost all mucous surfaces, and the glands connected with them, as well as the kidneys, are excited to increased secretion. But when the quantity is more considerable, heat of the mouth, tongue, and throat, with spasmodic constriction of the pharynx, thirst, pains in the stomach and intestines, alternate heats and chills of the whole body, perspirations, anxiety, pain of the head, giddiness, depression of spirits, gloomy expression, and even spasms of the countenance are experienced: if vomiting fortunately occur early, these symptoms are alleviated. Schabel says that no substance so certainly acts as an emetic. If the substance be introduced into the rectum, the symptoms are the same, except that the heat of the mouth and pain of the stomach are less. In decidedly poisonous doses its action is that of a violent narcotico-acrid, causing severe vomiting and purging, often bloody stools, tenesmus, burning feeling from the mouth to the rectum, constriction amounting to a sense of strangulation in the throat, with small pulse, faintings, cold sweats, giddiness, blindness, dilated pupils, loss of voice, convulsions, and insensibility, generally terminating in death. The tincture and the alcoholic extract act more powerfully than the watery infusion or extract. A cutaneous eruption sometimes follows the use of white hellebore. Where death does not ensue, palpitation with intermitting pulse, along with dyspeptic and nervous symptoms, remain for some time. The application of white hellebore to wounds or any broken surface, either to destroy vermin or to cure the itch, may produce the above effects; and this result occurs whether it is used in powder, as a wash, or ointment. The popular use of these is therefore to be discouraged. White hellebore is occasionally mistaken for Galanga root, and the seeds for those of cumin: intentional poisoning with it is rare; but from the use of it among soldiers who have recourse to it from its property of producing palpitation of the heart, and thus simulating disease of that organ, in hopes of obtaining their discharge, violent and indeed fatal effects ensue. An efficient antidote is scarcely to be found. Samuel Hahnemann, overrating the antagonizing power of coffee, recommends that article; but at best it can only combat the narcotic symptoms, which are not the most formidable. Astringent drinks have also been proposed, but they are not to be relied on. Acid drinks seem more serviceable: hence tamarinds, or cream of tartar may be given, followed by demulcent or oily fluids. Vomiting should be encouraged.

The medicinal employment of white hellebore is not very great in the present day; but when administered with due caution it is of great service in gouty and dyspeptic disorders, where there is torpor of the liver, sluggish bowels, and defective secretion from the bowels. From its influence on these organs it often proves useful in chronic cutaneous diseases, in which the digestion is always impaired. It is likewise used as a sternutatory, largely diluted with some starchy powder. Externally veratria is employed to relieve nervous pains; but as it requires the greatest caution.

VERB (from the Latin *verbum*, a 'word'). The various words which belong to a language have been distributed into classes, called the Parts of Speech, of which the verb is one of the principal. Dr. Becker has divided all words into two chief classes, Notional Words and Relational Words, the characteristics of which are explained under NOTION. The verb is a Notional word; and each word in its simplest form it is a Root.

The term Verb comprehends those words in a language which are used to indicate the relations of mode or mood, and the relations of time or tense; the relations of mood and tense are the essential characteristics of the verb. The verb is also characterized by indicating the relation of subject to subject, or subject to object, whether these relations are expressed by some part of the word called verb, or by some other words which are to be viewed in relation to the verb, in order to denote these relations of subject to subject or subject to object. Thus the Latin forms 'amo,' 'I love;' 'lego,' 'I read,' comprehend the relations of mode, time, and subject; and the phrases 'amo puellam,' 'lego librum,' comprehend also the relation of the subject to an object. If we examine the words of a language by the aid of this description, there is no difficulty in determining the verbs; and it is true, as Dr. Becker states, that they contain the notion of an activity; but this activity may be either directed from a subject to an object, or remain in the subject, as 'I love Elizabeth,' or 'I walk.' Dr. Becker observes, "The notion of an activity is expressed by a verb when the activity is contemplated as bearing the relations of person, time, and mood to the speaker: *e.g.* 'he drinks,' 'he fled,' 'the tree grows:' it is expressed by an adjective when it is not thus related to the speaker: *e.g.* 'a drunken person,' 'a flighty thought,' 'a great tree.' The notion of an existence, *i.e.* of a person or thing which really exists or is conceived by the mind as existing, is expressed by a substantive: *e.g.* 'a drinker,' 'a drink,' 'the flock,' 'the flight,' 'the growth.' All notional words according to him are either verbs, adjectives, or substantives."

Dr. Becker considers, in general, all roots to be verbal and all radical notions as notions of activity. He concludes, consistently, that all substantives as well as adjectives are derived from verbs, that is, from a root which is a notion of activity; and 'all notions expressed by substantives are notions of activity transformed into notions of existence.' This theory of language involves many difficult questions as to the origin of our ideas, and for practical purposes it is of little value. It is beyond the limits of grammar.

For philological purposes, no word should be viewed as a verb, unless it has the adjuncts of mood and tense. Words when reduced to their simplest forms, that is to their roots, are neither verbs, nor nouns, nor adjectives: they are roots. The discussion whether the noun or the verb should be considered the root, in cases where both contain a common element, is a discussion about nothing at all. The element may exist in a somewhat varied form in the noun and in the verb, and the variations in each case can be referred to a particular class of verb and noun. The characteristics of the verb have been already stated.

The characteristics of the noun are the same as those of the adjective; and nouns and adjectives are those notional words which are not verbs. All other notional words are verbs. When the characteristic marks of verb, adjective, noun are taken away, there remains root, which in f has no grammatical name as opposed to any other l of word. Roots may be classified like grammatical ls, but they are still roots and nothing more. The only ulty that may be suggested as to this explanation is the root and the noun may be identical in form, as in y instances in our own language, such as 'man,' 'dog,' But the answer is, that though these words in them- es suggest a notion of something intelligible, they are nouns, unless they are used as parts of speech. It is when we view words as the constituent parts of lan- ge that we give them grammatical names.

ccording to Becker's principles, the verb 'to be' is a verb: it implies 'not a notion, but a mere relation;' is therefore a relational word. But 'to be' implies the on of existence, and is the only word that does; for e contemplate anything as existing, such as God, the on of 'is' is inseparable from the notion God: and so ther things that are conceived as existing. All verbs are resolvable into 'is,' and something else; and by virtue of this 'is' that this something else is con- ed to be. In fact, the fundamental principles of ker involve much which is not purely philological.

iewing the verb, as above defined, as a root with its modi- ions of mood, tense, and person, it remains to consider s of its other qualities. The division of verbs into ve, Passive, and Neuter is founded on the notion of a expressing doing, suffering, and a condition. But this sion is objectionable, because it introduces considera- s foreign to the subject of grammar: it involves a me- ysical question. The division of verbs into Transitive Intransitive is a grammatical division, and is useful. erb is transitive when it has an object which is not the ect, as 'I blame John.' A verb is intransitive when subject of the verb is the object of the notion of the . Intransitive verbs therefore, considered as gramma- forms, comprise what are called Neuter verbs and Pas- verbs. Viewed with reference to predication, that of the intransitive verb which is called the neuter, as alk,' differs from what is called the passive, as 'I am d,' merely in this: the neuter implies nothing external e 'I,' which is the object of its own energy; the pas- implies something external to the subject, of which nal thing the subject is an object. Consequently it ly another mode of expressing the notion of the transi- verb. The peculiar form which this so-called passive has, depends on the character of each language. The alled Reflective verb is in form either a transitive verb n the subject is also expressed as its own object, or a ive verb, in which the implied external thing is iden- with the subject.

e peculiar characters of verbs in any given language an important part of the study of such language. It been said that mood and tense are the characteristics verb; but it is not necessary that the words which te mood and tense should be attached to the root for purpose of making a verb. The English language con- s cases where the words which express mood and tense quite distinct from the root, which their relations to it vert into the quality of verb. Whether such modify- words shall be attached to the root or not, is an acci- t of language, not an essential; but whether attached not, the root is never a verb without the aid of these uncts. It is by virtue of their adjuncts that the root omes a part of speech. There may be other adjuncts the root besides mood and tense, and these adjuncts y, according to the character of a language, be either ched to the root, or detached from, though related t.

ERBASCINÆ, a natural order of plants constituted Nees von Esenbeck, and comprising the genera Ver- cum, Ramondia, Celsia, and Isanthera. Three of these era are comprised in the section Verbasceæ, of the er Scrophulariaceæ, as defined by Bentham, who is owed by Lindley and others. The species of this order sist of perennial and biennial herbs, with a mucilagi- us character, having opposite or alternate decurrent ves, seated on a straight or twiggy stem. The flowers disposed in terminal, usually elongated racemes or kes. The corollas are white, yellow, or purple, and the aments of the anthers are usually bearded. The corolla rotate, with a flat 5-cleft unequal limb, or ventricose with bilabiate limb. The stamens are 5 in number, of different forms, and the upper one is frequently wanting, with 1-celled anthers adnate to the hatchet-formed connective. The carpels 2, joined to form a capsule dehiscing at the apex, the endocarp forming a bipartible dissepiment. The placentæ are marginal, but form a central column, which constitutes the axis of the dissepiment, and is prominent in the cavity of both carpels. The seeds are numerous, albuminous, and reniform, with a curved central embryo. This order differs from Solanaceæ and Scrophulariaceæ in its 1-celled, reniform or oblong anthers, differently formed sometimes in the same flower. It may perhaps be fairly questioned whether so slight a distinction should separate these plants from orders to which they are so nearly allied. This however will depend on each author's idea of the value of an order; and frequently by separating doubtful genera and placing them in distinct orders the larger groups from which they are separated are strengthened and more easily defined. The genera which are brought together in this order have been referred by various authors to different orders: thus Verbascum and Celsia are usually referred to Solanaceæ, and Ramondia to Gesneraceæ.

The genus *Verbascum* derives its name from *barbascum*, which was applied to some of the species on account of the bearded filaments: hence also the Italian name *barbasso*. It has a 5-parted calyx; rotate funnel-shaped corolla; 5 stamens, all bearing anthers, which are only occasionally not all lunate in the same flower; a 2-valved capsule with seeds attached to the central placenta. There are about 70 species: they have strong erect stems, with broad decurrent leaves, and yellow, white, or purple flowers, disposed in dense or loose racemes or spikes.

V. Thapsus has crenated, decurrent, oblongo-lanceolate, tomentose leaves; dense, racemose spikes; pedicels of the flowers shorter than the calyx; the segments of the calyx lanceolate, acute, and tomentose above, and equal in length to the fruit; the corolla with the anther nearly equal. This plant is a native of waste sterile places, especially of chalky and gravelly soils, throughout Europe. It is also found in Siberia, Taurus, and Caucasus, and in Nepaul and Kumaon. The leaves are remarkable for their woolly character, from which the English name Mullein seems to have been applied to the whole genus. Mullein (French, Molène) is said to be a corruption of Woollen, and in German the plants are called Wolkräuter. In different districts in England this plant has very various names. In the northern counties it is called Hag-taper, from some supposed efficacy in sorcery: in many places this has been corrupted into Hig-taper and High-taper. Torches, Bullock's Lung-wort, Hare's Beard, Ladies' Fox-glove, Murrain-grass, Shepherd's-Club, &c., are other names. The specific name *Thapsus* has been given it on account of its growing in great abundance in Thapsos in Africa. It is also abundant in Greece, and appears to have been the φλόμος λευκὸς ἄῤῥην of Dioscorides. This plant was formerly much used in medicine, and was considered to possess emollient and narcotic properties, and on this account it still occupies a place in the Dublin Pharmacopœia. It was used in cases of chronic catarrh and other affections of the chest, in the form of infusion or decoction; it is however seldom prescribed at the present day, although it has still a popular reputation in these diseases, and is also used by the cowleech in the pulmonary complaints of cattle. The seeds are said to possess narcotic properties, and are sometimes used for the purpose of intoxicating fish in order to catch them. In some parts of the East Indies where this plant grows, the natives believe that it has the power of protecting them from the influence of evil spirits. The French call this plant *Bouillon blanc*, and use an infusion of the flowers as a remedy in coughs. When dried in the sun the flowers are said to give out a fatty matter, which in Alsace is used as an application to hæmorrhoids.

V. Blattaria, Moth Mullein, has glabrous leaves, the lower ones obovate-oblong, attenuated at the base, and somewhat sinuated; those of the stem oblong, acute, crenated, sessile; the racemes terminal, elongated; the pedicels solitary, twice as long as the bracts. It is a native of the middle and south of Europe, some parts of Asia and North America. It is not a common plant in Great Britain, although in some places it is abundant. It is called *Blattaria*, because it is said to drive away the Blatta or Cockroach.

V. pulverulentum, Yellow Hoary Mullein, has ovato-oblong subserrated leaves, pulverulento-tomentose on both sides; racemes panicled; pedicels equal in length to the calyces; stem rounded. This plant is a native of Dauphiny and of Great Britain, especially in the counties of Norfolk and Suffolk. It is one of the most magnificent of our native herbaceous plants, sending up stems a yard high, which are covered with hundreds of golden-coloured flowers. If the stem is struck violently the corollas will fall off, and the empty calyces will close around the capsules. The leaves are covered with a pulverulent mealy substance, which may be easily removed from the surface. The nap from this and several other species may be used as tinder.

V. nigrum, Dark Mullein, has oblongo-cordate, petiolate, crenated leaves, nearly smooth above, but clothed with fine tomentum beneath; racemes elongated; pedicels twice as long as the calyx. It is native throughout Europe and in Siberia, and is common on banks and waysides in gravelly and chalky soils in England. It is rare in Scotland. This is one of the most elegant of the species. The corollas are of a golden-yellow colour; the filaments of the stamens are violet; and the anthers orange.

V. Lychnitis, White Mullein, has oblong wedge-shaped leaves, nearly glabrous above, but clothed with tomentum below; racemes panicled; pedicels twice as long as the calyx. It is found amongst rubbish and in waste places throughout Europe, in the North of Asia, and in North America, and is not uncommon in Great Britain. The corollas are of a pale yellow, the filaments are covered with a white wool, the pollen is of a vermilion colour. There is a variety with white flowers, and another without petals. The powdery tomentum is used as tinder, and for making wicks for lamps, and hence its specific name from λύχνος, a lamp.

Of the other species few or none are used in the arts or medicine, or are introduced into our gardens. The determination of many of the species has been attended with much difficulty on account of the strong tendency that exists amongst these plants to produce hybrids. These hybrids generally perish in the course of two or three generations; at the same time there is reason to suppose that some of them exist in herbaria as species.

All the species of Verbascum are tall, robust, handsome plants, and may be cultivated in gardens and shrubberies. Most of them thrive in any common soil in the open air, and may be propagated by seeds, or the perennial species by dividing the roots. When two or three species are grown together in gardens, the tendency to hybridization amongst these plants becomes very evident in the changed characters of the successive generations.

The genus *Celsia* was named in honour of Dr. Olaus Celsius, Professor of Greek and Theology in the University of Upsal. It has a 5-parted calyx, a 5-lobed rotate corolla, 4 didynamous bearded stamens, and woolly anthers. The species are herbs with simple or pinnate leaves, and the flowers are disposed in loose terminal racemes, rising from the axil of a bract or leaf. Most of the species of Celsia, of which there are about a dozen, bear showy yellow flowers, and are often cultivated in gardens. They require more care than the mulleins. They may be propagated by seeds, which should be reared in a hotbed, and the young plants protected under a greenhouse frame through the winter; and in the second year they may be planted in an open border, where they will flourish during the summer.

The genus *Ramondia* was named after M. L. Ramond, a French botanist and traveller. Its flowers resemble those of Celsia, but the anthers are perforated at the apex. It has but one species, the *R. Pyrenaica*. It grows on the Pyrenees, and is a pretty little alpine plant, without any stem, and with hairy wrinkled leaves and large purple flowers. It is a hardy plant and well fitted for borders. It may be easily propagated by division of its roots.

(Don's Miller's *Dictionary*; *Cyclopædia of Plants*; Hooker's *British Flora*; Koch's *Flora Germanica*.)

VERBASCUM. [VERBASCINÆ.]

VERBENA, a genus of plants, the type of the natural order Verbenaceæ. Most of the species of this genus are [illegible], and are generally inhabitants of Europe and North America. The genus is known by a tubular calyx with 5 teeth, one of them generally shorter than the rest; a tubular corolla with the limb rather unequal, 5-cleft; the [illegible] included and sometimes only 2; the seeds 2 or 4, enclosed in a thin evanescent pericarp.

V. officinalis, Common Vervain, has 4 stamens with [illegible] erect somewhat hispid stem; the leaves lanceolate, [illegible] serrate, or trifid, with the segments cut rough: the [illegible] filiform, somewhat panicled, and the flowers rather [illegible] This plant is a native of waste ground and roadsides [illegible] most parts of Europe, and is common in England. [illegible] not found in Ireland. It is an inhabitant also of New [illegible] land. This is the ἱερά βοτάνη, 'holy herb,' of D[illegible] who ascribed great powers to it, especially in [illegible] tions. In most countries where it grows, it seems to [illegible] been invested with extraordinary powers. It at [illegible] entered into the composition of various charms and [illegible] philters, and has even now a popular reputation [illegible] disposing persons favourably towards those who [illegible] a dose to them. During the last century Mr. [illegible] pretended to cure scrophula by hanging a portion [illegible] root of this plant round the neck. Ray in his [illegible] through the pretensions of the Vervain, and exposed [illegible] This plant is called by Pliny *Verbenaca*, and was [illegible] great esteem by the Romans. The antient Druids [illegible] it next to the mistletoe and gathered it with religious [illegible] monies.

V. Aubletia, Rose-coloured Vervain, has [illegible] tary spikes, which are cylindrical after flowering [illegible] shaped bracts as long as the taper-pointed calyx; [illegible] 3-lobed, cut; stem erect. This plant is a shrubby [illegible] with the stem about a foot high, and flowers of a [illegible] or crimson larger than most of the genus. It is a [illegible] North America, in Georgia and the Carolinas, and [illegible] brought to Europe in 1774.

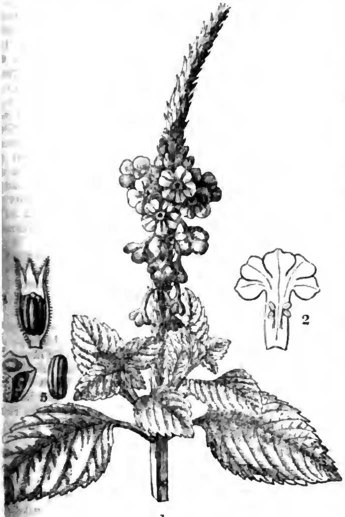
V. triphylla, Lemon-scented Vervain, has [illegible] spikes with minutely distantly-toothed leaves, [illegible] whorl; stem shrubby. This plant is a native of [illegible] was first discovered by the unfortunate Dombey, [illegible] troduced it into the gardens of Europe. In Italy, [illegible] and the south of France this plant is quite naturalised. In Jersey and Guernsey it bears exposure all the [illegible] This plant is used on the Continent for making [illegible] which, when cold, is administered as a cooling drink [illegible] fevers, slight catarrhs, &c. It has been separated from [illegible] genus Verbena by Palan, and is called by him [illegible] *citrodora*, a name by which it is more frequently known [illegible] modern works on botany. The flowers are small [illegible] a pale lilac colour; the leaves are green, and when [illegible] give out a very delicious scent, like that of the [illegible] citron. They retain their fragrance even a long time [illegible] they have been gathered.

The species of Vervain are frequently cultivated, [illegible] they are not very showy plants. They may be [illegible] by seeds, which should be sown in pots or on a [illegible] the spring. When strong enough, the plants [illegible] placed in separate pots and again placed in a [illegible] they have taken root, when they may be [illegible] Those which do not produce seed in this climate [illegible] increased by planting cuttings in the summer [illegible] pots of good mould. Many of the species may [illegible] pagated by dividing the roots and planting them [illegible] on the bark-bed of the stove.

VERBENACEÆ, a natural order of plants [illegible] to Lindley's nucamentose group of monopetalous [illegible] gens. The species are trees or shrubs, sometimes [illegible] herbaceous plants, with generally opposite, simple [illegible] compound leaves without stipules. The flowers [illegible] opposite corymbs or spiked alternately, sometimes in [illegible] heads, and very seldom axillary or solitary. The calyx [illegible] tubular, persistent, inferior; the corolla is hypogynous, [illegible] nopetalous, tubular, deciduous, generally with an [illegible] limb; the stamens 4, didynamous, seldom equal, [illegible] ally 2; ovary 2-4-celled; ovules erect or pendulous, [illegible] or twin; style 1; stigma bifid or undivided: fruit [illegible] taceous, sometimes berried, composed of two or four [illegible] in a state of adhesion; seeds erect or pendulous, [illegible] none, or in very small quantity; embryo always [illegible] (Lindley.)

The great difference between these plants and [illegible] Lamiaceæ or Labiatæ consists in their concrete [illegible] terminal style, and the absence of oil-glands from [illegible] leaves. There are however species placed in both [illegible] which in one or more of their characters very nearly [illegible] proach the other. From Acanthaceæ and [illegible]

ese, to which they are allied in many points, they are
inguished by their 1- or 2-seeded indehiscent carpels.



Verbena mutabilis.

Cutting with flowers; 2, corolla opened with didynamous stamens;
yx opened with nucamentose fruit; 4, section of single fruit; 5, single
d.

he plants of this order are rare in Europe, in the north
Asia, and in the north of America; they are common
he tropics of both hemispheres and in the temperate
ricts of South America. In temperate regions the
cies belonging to the order are herbs, but in tropical
nates they are shrubs and gigantic trees.

he plants belonging to this order have no very active
perties; those attributed to the vervain [Verbena]
ear to have been imaginary. The Lantana pseudo-
e is said, by Geoffroy St. Hilaire, to be used in Brazil
a substitute for tea, and is vulgarly called Capitaõ do
tto, or Cha de pedreste. The Teak-tree [Tectona],
the Brazilian tea-tree [Stachytarpha], and the
aste-tree [Vitex], belong to this order.

ERCELLI, *The Province of*, a province of the Sar-
ian continental dominions, bounded on the north by the
vinces of Val di Sesia and of Biella, east by the provinces
Mortara and Novara, south by the Po, which divides it
m the province of Casale, and west by the provinces of
ea and Turin. The province contains 73 communes
d 105,000 inhabitants. It is mostly a plain sloping
wards the south, and through which runs from north to
uth the river Sesia, an affluent of the Po. The rivers
rvo and Elvo, which rise in the mountains of Biella,
w through the province of Vercelli in a south-east direc-
n and join the Sesia above the town of Vercelli. A
nal for the purpose of irrigation, called Canale d'Ivrea,
d also Canale di Santhià, from the town of that name,
ceives part of the water of the Dora Baltea below Ivrea,
d after irrigating the plain of Vercelli empties itself into
e Sesia near Vercelli. This canal is one of the largest
Piedmont. The lower part of the province of Vercelli
nsists of rice-fields, which are laid under water during
e summer until September, when the water is let out,
d the rice is reaped. This system of cultivation renders
e country unhealthy, and engenders fevers and other dis-
ses, especially among the labourers who work in the
isiere,' or rice-grounds. [Oryza; Pellagra.] The
rovince of Vercelli produces also corn, wine, and silk in abundance. Vercelli, the head town, situated on the left bank of the Sesia, near the site of the antient Vercellæ, a town of Cisalpine Gaul, is a large and well-built but somewhat decayed town, in an atmosphere rendered unhealthy by the rice-grounds: it is a bishop's see, has many churches, convents, and palaces, a gymnasium, a clerical seminary, a large hospital with a botanical garden and a museum of anatomy attached to it, and about 15,000 inhabitants. The principal buildings are—1, the cathedral, a modern building, which has among its curiosities a MS. of the Gospels of St. Matthew and St. Mark in Latin, written on vellum, said to be by the hand of Eusebius, bishop of Vercellæ, in the fourth century. This Latin translation differs from the Vulgate of St. Jerome. 2. Santa Maria Maggiore, an old church, with a number of marble pillars, and a mosaic pavement representing the history of Judith. 3. S. Andrea, a Gothic church. 4. S. Cristoforo, a church with some good paintings by Gaudenzio Ferrari of Varallo. 5. The town-house, which is the residence of the Intendente, or political governor. 6. The market-place, which is surrounded by good buildings. 7. The gate leading to Milan, which is of good architecture. Vercelli is on the high road from Turin to Milan, and about half-way between those two cities. Borgo Vercelli is a suburb on the opposite or left bank of the Sesia, with about 2000 inhabitants. It was in the plains of Vercellæ that the Cimbri were defeated by C. Marius, 101 B.C. Vercelli was a municipal town of some importance in the middle ages, and had a celebrated school in the thirteenth century for the study of law and divinity, which was frequented by students from various countries. The other towns of the province are—1. Santhià, a town of 3300 inhabitants, on the road from Vercelli to Ivrea. 2. Trino, a town of about 7000 inhabitants, in a low marshy plain near the Po. Trino is a great market for cattle and pigs. The hams of Trino are in repute in Northern Italy. 3. Crescentino, west of Trino, on the high road to Turin, has about 4000 inhabitants, and some remains of Roman buildings in its neighbourhood. 4. Livorno, not far from Crescentino, has 3600 inhabitants, who deal in silk, the produce of the country. 5. Gattinara, on the banks of the Sesia, north of Vercelli, has 3700 inhabitants: its territory produces good wine.

(*Calendario Sardo*; Denina, *Quadro Statistico dell' alta Italia*; Valéry, *Voyages en Italie*.)

VERCHNEI UDINSK. [Siberia, xxi., 472.]

VERCHOTURIE is a town in the Russian government of Perm, situated on the river Tura, in 58° 50′ N. lat. and 61° 20′ E. long. It has five churches, two convents, a bazaar, a corn-magazine, and 3000 inhabitants. The extent of the town, its lofty stone churches, its solid ramparts erected in 1605, form a singular contrast with the present condition of the inhabitants, and prove to be only monuments of departed prosperity; for it was formerly a place of great importance, the residence of a Woiwode, and the staple of the whole trade of Siberia, which was not allowed to take any other road, because the duties of customs were to be paid here; but this having ceased more than a century ago, it is now become merely an insignificant chief town of a circle. Professor Erman says, 'The ground became more and more level, till, as we issued from the forest near Verchoturie, we found ourselves in a perfectly horizontal plain; yet here, for the first time in our progress northwards, we were to find again the granite rocks of the Ural.'

It is remarkable that in the granite of Verchoturie Professors Kupffer and Erman found black prismatic crystals, 'of which,' says Professor Rose, 'some specimens have been shown me by Professor Kupffer. From the measurements which I made of them after my return, the crystals are black epidote, or Bucklandite, a very rare mineral, hitherto known only as occurring at Arendal in the beds of iron-ore.' 'Near the town we visited a spring, the water of which is of the temperature of + 2°·10 Réaumur, which is 2°·6 Réaumur colder than the springs which issue from the summit of the Brocken in Germany. But how fine is the vegetation here, compared with that of the German mountain! What a difference between the stunted pine, which stands isolated on the barren moor, and the luxuriant green thickets round this spring, and the noble lofty pines that adorn the plain of Verchoturie!'

(G. Rose, *Reise nach dem Ural, dem Altai, und dem*

Caspischen Meere, von A. von Humboldt, G. Ehrenberg, und G. Rose; A. Erman, *Reise um die Erde;* Stein, *Lexicon;* Cannabich, *Lehrbuch*.)

VERCINGETORIX. [CÆSAR.]

VERDE, CAPE, ISLANDS. [CAPE VERDE ISLANDS.]

VERDIGRIS. [COPPER.]

VERDEN, *The Principality of*, in the duchy of Bremen, in the kingdom of Hanover, is situated between 52° 50′ and 53° 25′ N. lat. and 9° 10′ and 10° 10′ E. long. It is bounded on the north-east, east, and south by Lüneburg, on the south-west by Hoya, on the north-west by Bremen. The area is about 520 square miles, and the number of inhabitants 34,000, who all follow the Lutheran faith. The country is quite level; the interior of the duchy of Bremen, of which it is a part, contains extensive heaths and immense peat-mosses, forming a low tract, partly sandy, partly marshy, strewed with innumerable large blocks of granite, without a hill, and with only isolated groups of trees. It produces some corn, pulse, and potatoes, and has the common domestic animals. It was formerly a bishopric, but was secularised at the peace of Westphalia, and assigned to Sweden. In 1712 it was conquered by the Danes, who sold it to the elector of Brunswick Lüneburg, since which time it has belonged to Hanover, except that it was subject to Napoleon from 1803 to 1814, when it was restored to Hanover. It is divided into two bailiwicks, Rotenberg and Verden.

VERDEN, the capital of the Principality, is situated in 52° 56′ N. lat. and 9° 15′ E. long., on the navigable river Aller, which here divides into two arms, and over which there is a bridge 400 paces in length. It is surrounded with walls, and has three gates. The principal building is the Gothic cathedral, besides which there is another church, an hospital, and a school attached to the cathedral. The inhabitants, about 5000 in number, have three tobacco and snuff manufactories, some breweries and brandy distilleries, but are chiefly engaged in cultivating the fields and gardens of the environs. They also derive some advantage from the fishery in the Aller, and from the transit-trade between Hamburg and Westphalia.

(Hassel; Cannabich; Stein; Hörschelmann.)

VERDETER. [COPPER.]

VERDIC ACID, an acid discovered by Runge, and so named from its property of becoming green by exposure to the air. It is obtained from several of the *Umbelliferæ*, *Plantagineæ*, &c., but chiefly from the root of the *Scabiosa succisa*. When combined with excess of base, it becomes green in the air, owing to the absorption of oxygen; Berzelius therefore proposes to call the colourless the *verdous* and the coloured the *verdic* acid. The former is obtained by digesting the dried and powdered root of the scabiosa in alcohol, from which on the addition of æther white flakes are thrown down, to which, dissolved in water, acetate of lead is added, and the precipitate, being thrown down, is decomposed by hydrosulphuric acid. By evaporating the filtered liquor the acid is obtained in the state of a brittle yellow mass, which reddens litmus and does not alter in the air. When it is saturated with an alkali, ammonia for example, and exposed to the air, it absorbs oxygen and becomes gradually green. The acids then precipitate it in the form of a reddish-brown powder, which is verdic acid: this redissolves and becomes green with the alkalis. The earthy or metallic *verdites* are yellow, while the *verdates* of the same bases are green. Runge states that he found by analysis that verdic acid contains one equivalent of oxygen more than the verdous acid.

VERDICT. [JURY.]

VERDUN, a town in the north-eastern part of France, capital of an arrondissement in the department of Meuse, 138 miles in a direct line east by north of Paris, or 151 miles by the road through Meaux, Château-Thierry, Epernay, Châlons-sur-Marne, and Ste. Ménéhould; in 49° 9′ N. lat., and 5° 23′ E. long.

Verdun stands on the Meuse, which here flows in several channels so as to divide the town into five parts, connected with each other by a number of bridges over the different arms of the river. The town is fortified, and has a strong citadel at its western side. The streets are irregularly laid out, and some of them are steep and ill-paved. There are a cathedral and five other Roman Catholic churches (one of which, the church of Notre Dame, has a handsome high altar), a Protestant church, and a Jews' synagogue; a town-hall; an ex-episcopal palace; barracks for cavalry, and a theatre.

The population of the commune in 1826 was 9900; in 1831, 9978; and in 1836, 10,577. The townsmen manufacture cotton-yarn, coarse woollen cloths, flannel, serge, brushes, candles, hats, nails, and chamois-leather; beer, liqueurs, and confectionery. In some years more than 160,000 lbs. of dragées (*i. e.* sugar-plums, sugared almonds, &c.) have been sold; and nearly 400,000 gallons of liqueurs. The navigation of the Meuse commences at Verdun, and the town is at the convergence of roads communicating respectively with Paris, Metz, Luxembourg, and Sedan. There are a subordinate court of justice and a tribunal of commerce; two prisons; two hospitals, one of them military; an establishment of the Sisters of Charity; a communal high school; a public library of 12,000 volumes, including a number of chronicles of the ninth, eleventh, twelfth, and thirteenth centuries; and a museum of natural history and antiquities, belonging to the Philomathic Society.

Verdun was known to the Romans by the name Virodunum, or Verodunum, and was the chief town of a small tribe or nation, the Verodunenses, who took their name from the town. Gregory of Tours writes the name Virodunum, and other writers of the middle ages have Veredunum and Virdunum. In the middle ages it was included in the Germanic empire, of which its bishops were princes. In 1552 it submitted to Henri II. of France, and was definitively ceded to France at the peace of Münster in 1648. It was taken by the Prussians when they invaded France in 1792, and retaken after the battle of Valmy. Many of the English who were arrested in France after the rupture of the treaty of Amiens, and many prisoners of war, were kept at Verdun.

Verdun is the seat of a bishopric; the diocese comprehends the department of Meuse; the bishop is a suffragan of the archbishop of Besançon.

The arrondissement of Verdun has an area of 580 square miles, and comprehends 149 communes: it is subdivided into 7 cantons or districts, each under a justice of the peace: the population in 1831 was 80,897; in 1836, 82,241.

(Malte-Brun, *Géographie Universelle; Dictionnaire Géographique Universel;* Dupin, *Forces Productives, &c. de la France*.)

VERE, SIR FRANCIS, a distinguished English military commander in the reign of Elizabeth, was born in 1554. His father, of whose four sons he was the second, was Geoffrey de Vere, third son of John de Vere, fifteenth earl of Oxford; his mother was Elizabeth, daughter of Richard Hardekyn of Colchester. Of the first thirty years of his life nothing appears to be known: he began his career of active service as one of the captains of the force sent, under the command of the earl of Leicester, to the assistance of the Dutch in the latter end of the year 1585. Here he soon made himself conspicuous both for bravery and conduct; and he had a leading part in most of the chief passages of the war between the Dutch and the Spaniards throughout the next fifteen years. In 1587 he was one of the defenders of the town of Sluys against the prince of Parma, to whom however the place was eventually forced to surrender. In 1588 he was one of the garrison which successfully defended Bergen-op-Zoom against the same assailant; and for his services on this occasion he was knighted by Lord Willoughby, who had succeeded Leicester in the command of the English auxiliaries. In 1589, being put in command of a small corps of six hundred of his countrymen, and left to defend the Isle of Bommel against Count Mansfeldt, he so strengthened the place by his active and judicious measures, that the enemy, though in great force, retired without attacking it. The same year he twice threw a supply of provisions, and the second time also a reinforcement of troops, into the town of Berg, while besieged by the marquis of Warrenbon. In the latter of these attempts he nearly lost his life in an encounter with a party of the enemy; his horse, having been killed by a pike, fell upon him, and he received several thrusts and hurts before he could be extricated. In 1590 he in like manner relieved the castle of Lichtenhooven; and in the same year he recaptured the town of Burick. His services in 1591 were, the surprise of a fort near Zutphen, which materially facilitated the reduction of that town; the important assistance which he rendered ant Maurice at the siege of Deventer; and the share he in the signal discomfiture given to the duke of Parma ore Knodzenburg fort, near Nimeguen, which is stated have been brought about mainly by his management exertions. In 1592 he obtained a seat in the House Commons as one of the members for Leominster; but is supposed to have remained nevertheless in the ser- of the States of Holland, although it does not appear he was employed for the next three or four years. en the first expedition against Cadiz was resolved upon, he beginning of 1596, Sir Francis Vere was sent for to gland, and thence dispatched back immediately to inti- te the design to the States; and having then joined the pedition as one of the commanders of the land forces, one of the council of war appointed to advise the mmanders-in-chief, lords Essex and Howard of Effing- n, he greatly distinguished himself, both in the action h the Spanish fleet, on the 20th of June, and in the cessful attack upon the town of Cadiz two days after. e latter part of this year he spent in England; but in beginning of 1597 we find him again in Holland, where and Sir Robert Sidney commanded the English aux- ries in the engagement near Turnhout on the 24th of uary, in which the Spaniards were defeated with great ghter by Count Maurice. In the summer of this year again accompanied his patron the earl of Essex on his ond expedition against Spain, which was attended with result; and after his return home he received from the een the government of Briel (the Brill), which was one the cautionary towns, as they were called, given up for ime by the Dutch to their English allies. He also held der the States the command of the English troops in the vice of Holland; and although he resided principally at government, he made repeated visits to England, and th attended at court and was occasionally employed in gotiating affairs of state between Elizabeth and the Dutch vernment. In August, 1599, when a Spanish invasion s apprehended, he was sent for home in great haste, and nstituted lord-marshal; and it is said that it was at one me proposed to make him lord deputy of Ireland. He pears to have been personally a favourite of Elizabeth, d Essex also seems to have been his steady friend, al- ough he himself imagined at one time that he had not en well used by that nobleman; but he had drawn upon nself the rivalry and jealousy of Raleigh and the en- ty of Burleigh. In 1600 he was joined with Count Er- st of Nassau and Count Solmes in the command of the ny which the Dutch sent into Flanders; and to his ex- ions was principally owing a great victory obtained over Spaniards, near Nieuport, on the 5th of July. Sir ancis received two shots in the thigh in this battle; but kept the field till his horse fell dead under him, when was with difficulty rescued. The following year, on the chduke Albert sitting down before Ostend, at the head an army of 12,000 men, he was appointed by the States neral of all their forces in and about that important ace, and immediately threw himself into the beleaguered wn. Here, with very inadequate resources, he held out r about eight months, having succeeded in repelling a eneral attack of the enemy on the 7th of January, 1602; d then, on the 7th of March, he resigned his govern- ent to Frederick Dorp, who had been appointed by the tates to succeed him. Ostend capitulated at last in 1604, ter the siege had lasted more than three years and three onths, and had cost the lives, it has been asserted, of above 0,000 men. His defence of Ostend, in the course of hich he had received a wound in the head by the acci- ental bursting of a cannon, was Vere's last service. He as reappointed to the government of the Brill on the ac- ession of King James; and he died in England on the th of August, 1608. He is styled Governor both of the rill and of Portsmouth on his monument in Westminster bbey, erected by his widow, Elizabeth, second daughter f John Dent, citizen of London. By this lady (who after- ards became the wife of the Hon. Patrick Murray, a son f the earl of Tullibardine, in Scotland) he had three sons nd two daughters, all of whom died before him. His military achievements have been recorded by his own pen n 'The Commentaries of Sir Francis Vere, being divers pieces of service wherein he had command, written by himself in way of Commentary;' which were published, rom his original manuscript, in folio, at Cambridge, in 1657, by William Dillingham, D.D.

VERE, HORACE, or HORATIO, LORD VERE, was the youngest of the three brothers of Sir Francis Vere, and was born at Kirby Hall in Essex, in 1585. He accompanied his brother to Holland in 1565, and shared in most of his exploits and enterprises there, as well as in the first expedition to Cadiz, for his valour on which last occasion he received the honour of knighthood. He particularly signalised himself both in the battle of Nieuport and in the defence of Ostend. In 1603 he joined the army under Prince Maurice, and in 1604 was greatly instrumental in the reduction of the town of Sluys. In the campaign of the following year, a retreat which he succeeded in effecting, with 4000 men, from the Spanish general Spinola, acquired him much reputation, and extorted the highest praise from Spinola himself. On the death of his brother, he succeeded him both as governor of the Brill and as general of the English forces in the service of Holland; but the twelve years' truce between the Dutch and the Spaniards kept him out of the field for the remainder of the time that he held the former of these appointments. The town of Brill being delivered up to the Dutch in 1616, Sir Horace Vere was allowed a pension by the king in consideration of his services. In 1618 he assisted the Prince of Orange in putting down the Arminians, or Remonstrants, at Utrecht, a measure of violence, one of the results of which was the destruction of the grand pensionary Barneveldt, who had been the attached friend of Sir Francis Vere. In 1620, when forces were raised in England for the assistance of the elector palatine, Frederic V., in his attempt to secure the crown of Bohemia, Sir Horace Vere was appointed to the command of them; and he behaved with his usual spirit in the disastrous contest which ensued, keeping the enemy at bay as long as it was possible, till he was obliged to surrender Mannheim, the last place of strength into which he threw himself, to the Austrian general, Count Tilly, in January, 1623. After his return home, he was, 20th July, 1624, nominated by King James one of the council of war appointed to manage the business of the palatinate; and immediately after the accession of Charles I. he was, on the 25th of July, 1625, raised to the peerage, by the title of Baron Vere, of Tilbury, in the county of Essex. He was the first peer made by Charles. In March, 1629, on the death of the earl of Totness, Lord Vere was made master of the ordnance for life. Still retaining his post of commander-in-chief of the English forces in the Netherlands, he continued occasionally to visit that country, and to take part in the war; but nothing further that is memorable is related of his military career. The last two years of his life were spent in England, where he died suddenly on the 2nd of May, 1635, being struck with apoplexy as he sat at dinner in the house of Sir Henry Vane at Whitehall. Fuller, who knew Lord Vere, describes him, in his 'Worthies,' as having 'more meekness and as much valour as his brother;' and as 'so pious, that he first made his peace with God before he went out to war with man.' Sir Francis, he says, was more feared, Sir Horace more loved, by the soldiers. By his wife Mary, third daughter of Sir John Tracey, of Toddington, in the county of Gloucester, who had been previously married to Mr. William Hoby (and who long survived her second husband also, dying, in 1671, at the age of ninety), Lord Vere had five daughters: Anne, married to John Hollis, second earl of Clare; Mary, married first to Sir Roger Townshend, father of the first Viscount Townshend, secondly to Mildmay Fane, earl of Westmoreland; Catherine, married to Oliver St. John, Esq., ancestor of Lord Bolingbroke; Anne, married to Thomas, Lord Fairfax; and Dorothy, married to John Wolstenholm, Esq., by whom however she had no issue. In 1642 an octavo volume was published at London, dedicated to Lady Vere, entitled 'Elegies, celebrating the happy Memory of Sir Horatio Vere,' &c.

VERELIUS, OLAUS, a celebrated Swedish antiquary, whose real name was Olaf Werl, was born on the 12th of February, 1618, in the village of Ragnildstorp, in the diocese of Linköping. He received his first education from his father, Nicolaus Werl, who was pastor at Ingatorp. After the completion of his preparatory education in the public school at Linköping, he went to the university of Dorpat, in Livonia, which was then a Swedish province. After a stay of four years, he returned to Sweden, and finished his studies at Upsala. In 1644 he became private tutor to two young Swedish barons, whom he accompanied in 1648 on a tour through Denmark, Germany, Holland, Switzerland, Italy, and France. At Paris the party stayed a whole year. On his return to Sweden in 1651, queen Christina appointed him professor of eloquence in the university of Dorpat, and the year after he received the same office in the university of Upsala, in addition to which he was made quæstor of the university. In 1662 he became professor of Swedish antiquities, and in 1666 antiquary to King Charles XI., and Assessor Antiquitatum in the king's privy-council. In 1679 he was appointed chief librarian of the library of Upsala, which was a kind of sinecure, and was only given to eminent scholars 'as a comfort in their old age, after they had achieved Herculean labours.' Verelius died on the 1st of January, 1682. In the Swedish epitaph on his tombstone he is called a real 'Runic stone,' to express his immense antiquarian knowledge.

Verelius is the author of numerous works, chiefly on Scandinavian antiquities, of which he possessed a most extensive knowledge. His historical statements must be received with great caution, as he was biassed by certain opinions respecting the Swedish origin of the Goths which were then common among the Swedish historians. In addition to this, Verelius was very tenacious in his opinions, however extravagant they might be, and of very irritable temperament, as we see especially in his polemical writings against his old friend John Scheffer of Strassburg, about the meaning of the name Upsala. But Verelius is nevertheless one of the best writers on the early history and antiquities of Scandinavia. His principal works are: 1, 'Gothrici et Rolfi, Westrogothiae Regum, Historia, &c., accedunt notae Joannis Schefferi, (Argentoratensis) Upsala, 1664, 8vo. This is the first edition of an old work written in the old Scandinavian language, or, as the editor calls it, the Gothic language. It contains the original text and a Swedish translation, together with a vocabulary in which the meaning of Scandinavian words is explained in Latin. 2, 'Itt Stycke af Konung Olaf Tryggiason's Saga hwilken pa Gammal Götska Beskrifwit hafwa Oddur Munk,' &c., Upsala, 1665, 8vo. (*i.e.* 'A fragment of king O. Tryggiason's Saga, written in old Gothic by Monk Oddur.') 3, 'Herrands och Bosa Saga,' Upsala, 1666, 8vo., with a Swedish translation. 4, 'Manuductio compendiosa ad Runographiam,' &c., Upsala, 1675, fol. This is written in Swedish, and dedicated to the celebrated Axel Oxenstierna, and contains thirty beautiful Runic inscriptions. 5, 'Notae in Epistolam defensoriam clarissimi viri, J. Schefferi, Argoratensis, de Ritu ac Vocabulo Upsaliae,' Upsala, 1681, fol. This work is written with such bitterness and vehemence, that it was prohibited two months after its publication. After his death appeared—6, 'Index Linguae veteris Scytho-Scandiae sive Gothicae,' &c., edited by Olaus Rudbeck, Upsala, 1691, fol. 7, 'Epitomarum Historiae Suio-Gothicae libri iv., et Gothorum extra patriam gestarum libri ii.,' edited by P. Schenberg, Stockholm, 1730, 4to. There are also two orations of Verelius, viz., 8, 'Oratio Panegyrica de Pace Suio-Germanica, habita Lugduni-Batavorum,' Leyden, 1649, fol. 9, 'Memoirae illustrissimi Comitis Axelii Oxenstierna Oratio Funebris,' Upsala, 1655, fol.

(Claudius Arrhenius Ornhielm, 'Vita Olai Verelii,' in the *Epitomarum Historiae Suio-Gothicae Lib. IV.*, where also a complete list of the works of Verelius is given: Compare Jocher's *Allgem. Gelehrten-Lexic.*, and Gley, in the *Biographie Universelle.*)

VERGENNES, CHARLES GRAVIER, COMTE DE, the son of a president *à mortier* of the parliament of Dijon, was born in that town on the 28th of December, 1717. His family had only recently been admitted among the *noblesse de la robe*. M. de Chavigny, who had been envoy in Spain and England, and whose niece had married a brother of Vergennes, undertook to initiate the young man into the diplomatic career: he took him as *attaché* to Lisbon in 1740.

In 1743 the French court exerted itself to procure the imperial crown for the elector of Bavaria. Chavigny was sent to Frankfort to manage the electoral diet, and Vergennes accompanied him. After the death of Charles VII., Chavigny returned with his pupil to Lisbon. Here Vergennes found for the first time an opportunity to display his capacity for business. The rival claims of Spain and Portugal to the territory of Monte Video were referred to the arbitration of the court of Versailles. Vergennes is [illegible] to have [illegible] into a memoir of four pages the substance of the voluminous pleadings of the parties. T Marquis d'Argenson was delighted with the abridge and in 1750 the young diplomatist was appointed min to the electoral court of Trier.

The meddling occupant of that ecclesiastical pr pality had contrived to make his court the centre of political intrigues of Germany. He held, in addition the electoral archbishopric of Trier, the bishopric of W was co-director of the circle of the Upper Rhine, p of Ellwangen, and senior of the ecclesiastical bench diet of the circle of Suabia. His interference wa everywhere. The empress-queen was, in 1750, pressing the election of her son Joseph, still a chi King of the Romans. The failure of her canvass wa buted to the influence acquired by Vergennes ove elector of Trier.

A visit paid by George II. of England to his p estates in Germany was seized upon by Maria The renew her intrigues. The duke of Newcastle, who the imperial dignity to remain in the House of assembled a congress of the ministers of all the Hanover. The discussions of this assembly nothing; and Vergennes, who had been sent to court, obtained the credit of having foiled the minister.

Newcastle shifted the scene to Manheim, and (1753) was immediately sent in pursuit of him. tached the elector-palatine from a convention about to conclude with the elector of Hanover in of the projects of Maria Theresa, and Wrede, the of the palatinate, was obliged to repair in person to apologise for his dealings with England and press.

From Germany Vergennes was sent to Consta Count Desalleurs, ambassador to the Porte, died on the 21st of November, 1754. A secret corresp had been carried on through his instrumentality the Ottoman court and Louis XV., unknown to the ministers. It was a matter of consequence the the king and his favourites that the papers of the ambassador should not fall into indiscreet hands gennes was deemed trustworthy, but his birth youth were obstacles to his appointment to the ambassador. Chavigny is said to have helped the tiers in this dilemma by persuading the marquis de sieux, minister for foreign affairs, that an envoy nary, or a minister plenipotentiary, was perfectly co to transact all the business of France at Constan and that as an agent of that rank would receive salary, and might live at less expense than an amb the difference might be employed to pay off the contracted by Count Desalleurs. Vergennes was ingly appointed, and embarked in a merchant Constantinople, where he arrived in company Baron de Tott in May, 1755. The Porte received under the designation of minister plenipotentiary: a few months, in consequence of a representation sultan, Vergennes received the title of ambassador.

He had a difficult game to play. England and urged the Porte to declare war against the emp Austria and Russia. Vergennes represented that princesses, being on friendly terms with France, necessarily be well disposed to Turkey, the ally of F The peace of 1763 put an end to these intrigues more serious difficulties ensued. Catherine II Poland on account of the opposition offered to Pon whom she had been instrumental in placing on the The Porte, which had guaranteed the integrity of P was disposed to interfere. Vergennes, believing that key was too weak to thwart the designs of the em and that it would only draw down upon itself a par tion in the disasters of Poland, counselled neutrality Duke de Choiseul exclaimed loudly against the apa the Divan and the timidity of Vergennes. Money remitted to the ambassador with strict injunctions to no efforts to engage Turkey in hostilities against R The minister was preparing reluctantly to obey, when an cident brought about what he had hesitated to unde Some Cossacks made a predatory irruption into the Cri and De Tott, who had been accredited by Choiseul to the khan, induced him to make reprisals. This led to a formal declaration of war against Russia by the sultan, on the 30th of October.

'ergennes's despatch containing the intelligence of this
at was crossed on the way by the courier who brought
recall. He carried back with him to Paris the money
to bribe the Divan to undertake a war, into which cir-
stances had precipitated them unbought. The Duke
Choiseul assigned the marriage which Vergennes had
racted with the widow of a surgeon of Pera as the
on for recalling him. Vergennes's recall was much re-
ed by the French residents at Pera, who presented him
a gold-hilted sword (une épée d'or) on the occasion.
is return to France he took up his abode on a property
possessed in Burgundy, and remained in retirement
the fall of the Duke de Choiseul.

a Vrillière, who held the portfolio of foreign affairs for
ort time after Choiseul's retirement, sent Vergennes to
den, allowing him to draw up his own instructions.
remained at that court till the death of Louis XV. It
during his residence that Gustavus III. accomplished
revolution which converted Sweden into an absolute
archy. Gustavus had made the French minister the
fidant of his designs, and the minister imparted them
is own court, but represented them as romantic visions.
cabinet of Versailles however directed him to assist
king of Sweden with money; and when Gustavus
ed his schemes into effect, the credit of direct-
him was attributed at Versailles to Vergennes,
was as a reward enrolled among the noblesse de
ée.

n the accession of Louis XVI. (July, 1774), Vergennes
made minister for foreign affairs. He remained minis-
till his death, in 1787, having held along with the port-
of his department that of president of the Council of
ance during the last few years of his life. The leading
events of his ministry were as follows:—In May,
, he concluded a treaty with the Swiss cantons in lieu
he separate treaties which it had been customary to
into with each. On the 6th of February, 1778, he
ed the treaty of alliance with the United States of
th America. He contributed materially towards the
blishment of the armed neutrality of the northern
itime powers, and assisted in persuading Spain and
land to commence hostilities against England. And
hese means he became an instrument in bringing about
recognition of the independence of the United States
the mother-country in 1783. In 1779 he obtained
urable conditions for the elector of Bavaria from
ph II.; and in 1785 he persuaded the emperor and
United Provinces to submit their differences to the
tration of Louis XVI. His last labour was the negotia-
of a treaty of commerce with England in the years
and 1786; and a similar convention with Russia in
, surviving the conclusion of the latter only fourteen
. He died on the 13th of February, 1787, after having
ed his country twenty-four years in the capacity of
assador and thirteen as minister of state. He left a
e fortune.

s a diplomatist, Vergennes, except in the case of his
ish mission, appears to have received credit for accom-
ing arrangements which in some cases had been
ght about without his interference, and in others
inst his wishes. It ought however to be mentioned at
same time that the course he wished to see adopted
he case of Turkey would have been the most prudent
that country, and that had Gustavus III. deferred
he wishes of Vergennes, he would have acted more
onsonance with the dictates of justice and for the
nanent advantage of his country. The part taken by
gennes in the American contest, and in the arrangement
he commercial treaty with England, is equally credit-
to his liberality, and to the soundness of his economi-
opinions. Here too however, as in his diplomatic mis-
s, he appears rather to have left what was inevitable to
pen of itself, than to have exerted himself to accom-
h what he considered desirable. He appears to have
essed in a high degree the diplomatic talent of look-
wise, doing nothing, keeping his own secret, and taking
lit for any good that was done. He carried diplomacy
private life, and was always on his guard; on the other
d, he was of an affectionate disposition, extremely fond
hildren, and an honest man. It was a thorough con-
ion of the integrity of Vergennes that made Maurepas
mmend him to Louis XVI. for the portfolio of foreign
rs; and it was the king's conviction to the same effect that enabled Vergennes to overcome all the cabals and intrigues of the court.

VERHE'YEN, PHILIPPUS, was born at Verbrouck in the province of Waas, in 1648. His father was an honest agricultural labourer, who gave him a homely education, and with whom he worked in the fields till he was 22 years old. At this time the pastor of the parish, discerning in the young Verheyen the marks of a superior intellect, undertook to teach him Latin during the winter vacations from his agricultural work; and in 1672 he had made such progress that the pastor obtained for him admission into the College of the Holy Trinity at Louvain, where, at the end of five years' study, he gained, in 1677, the highest place in the general examination of the four chief colleges. After this he studied theology for a short time: but he was diverted from his intention of entering the ecclesiastical order by losing his leg, in consequence of some acute disease which rendered amputation necessary. On his recovery from the operation, Verheyen applied himself to medicine. In 1681 he received, with especial marks of honour, his licentiate's degree: in 1689, having spent nearly all the intervening time in the study of anatomy and medicine at Louvain, he was appointed professor of anatomy there; and in 1693 professor of surgery also: but he did not, for some unknown reason, take his doctor's degree till 1695. He became by study, diligently continued to the end of his life, one of the most eminent anatomical teachers of his time, and his books were very widely read, especially his Anatomy of the Human Body. He was engaged on a large work, 'De Tuenda Valetudine,' when he died in 1710.

Verheyen's works are as follows: 1, 'Anatomiæ Corporis Humani, Liber primus,' Louvain, 1693, 4to.; a short compendium of anatomy which was several times reprinted and was completed after his death, in 1710, by the publication of a 'Supplementum, seu Liber secundus,' and of many additions to the original work. The two together, in two volumes 4to., were often printed; as, at Brussels, 1710 and 1726; Naples, 1717, 1734; Leipzig, 1731, &c. They contain no important anatomical discoveries, but were good useful books at the time of their publication. The second volume, which is the more interesting of the two, contains many analyses of animal fluids, and accounts of numerous experiments on living animals, chiefly having relation to development and respiration: but a great part of it is filled by the author's portion of a controversy with Méry in defence of the Harveian doctrine of the circulation. 2, 'Dissertatio de Thymo,' Louvain, 1706, 4to. 3, 'Compendium Theoriæ practicæ,' Cologne, 1683, 8vo. The first and second parts alone of this work were published. They treat of affections of the head and chest, and support the chemical doctrines of Willis. 4, 'Vera Historia de Sanguine ex Oculis, Auribus, Naribus, &c.' Louvain, 1708, 12mo. (Life, prefixed to the *Anatomia*, edition of Brussels, 1710; Haller, *Bibliothecæ*.)

VERMANDOIS, or VERMANDAIS, LE, a province in France, formerly included in the military government of Picardie. [PICARDIE.] Its capital was St. Quentin [QUENTIN, ST.], the Augusta Veromanduorum of the Romans. The province was the territory of the Veromandui, a Belgic nation of some importance, from whom it obtained its name. It is now included in the departments of Aisne and Somme.

The province constituted in the middle ages a county, the possessors of which were among the most powerful nobles of France. They were a branch of the royal Carlovingian family, being descended from Charlemagne by his grandson Bernard, king of Italy. Herbert or Héribert the Second, count of Vermandois, supported his brother-in-law Robert against Charles le Simple in their struggle for the crown of France; and on Robert's death, at the battle of Soissons (A.D. 923), supported Raoul of Bourgogne, who was appointed by Robert's adherents to succeed him. Héribert managed by treachery to seize Charles soon after. Having quarrelled with Raoul, Héribert professed an intention of restoring Charles; but having made up his dispute with Raoul, he retained Charles in confinement until his death (A.D. 929). After this, Raoul and Héribert quarrelled again (A.D. 931), and hostilities were carried on with various success until A.D. 935, when a reconciliation took place. A new war broke out (A.D. 938) between Héribert and Louis d'Outre-Mer, who had succeeded Raoul, and lasted four years (A.D. 938-942). Héribert died soon after its close (A.D. 843). Héribert IV. (A.D. 1077) united, in right of his wife, the county of Valois to that of Vermandois, and the united counties came into the hands of Hugues, son of Henri I. king of France, and one of the principal leaders of the first crusade (A.D. 1096). On his return from the East he took part in a second expedition, but lost 200,000 men on the route, and with difficulty escaped to Tarsus in Cilicia, where he died (A.D. 1101). Both Le Valois and Le Vermandois were united to the crown by Philippe-Auguste (A.D. 1215). (*L'Art de vérifier les Dates.*)

VERMES. Antient naturalists designated by this name all lower animals resembling in form the earthworm. Linnæus adopted it as the title of a class, including all animals which he could not arrange under the Vertebrata and Insecta. In the first edition of the 'Systema Naturæ,' he divides Vermes into four orders:—1st, *Reptilia*, including the intestinal worms, with the leech and earthworm; 2nd, *Zoophyta*, composed of the Chetopods, the naked Mollusks, Medusæ and Echinoderms; 3rd, *Testacea*, composed of Conchiferous Mollusks and Ascidiæ; and 4th, *Lithophyta*, containing the corals and corallines. In the nine following editions he replaced the name *Reptilia* by that of *Intestina*, changed *Zoophyta* for *Mollusca*, and applied the term *Zoophyta* to the animals he had at first called *Lithophyta*. In the eleventh edition he divides the class *Vermes* into five orders, viz. *Intestina*, *Mollusca*, *Testacea*, *Lithophyta*, and *Zoophyta*; *Lumbricus* and *Hirudo* being placed in the first; *Terebella*, *Aphrodite*, and *Nereis* in the second; whilst *Sabella* and *Serpula* are improperly associated with the *Lithophyta* on account of their hard tubes.

In the 12th edition the *Vermes* of Linnæus are divided into groups and genera thus:—

I. INTESTINA.

Simple, naked animals, destitute of limbs.

*

With a lateral pore.

Genera:—*Lumbricus*, *Sipunculus*, *Fasciola*.

* *

With no lateral pore.

Genera:—*Gordius*, *Ascaris*, *Hirudo*, *Myxine*.

II. MOLLUSCA.

α. *

A mouth above: fixing itself by the base.

Genera:—*Actinia*, *Ascidia*.

β. *

An anterior mouth: the body pierced with a small lateral foramen.

Genera:—*Limax*, *Aplysia*, *Doris*, *Tethis*.

γ. *

An anterior mouth: body surrounded with tentacles anteriorly.

Genera:—*Holothuria*, *Terebella*.

δ. *

An anterior mouth: body brachiated, or furnished with arms.

Genera:—*Triton*, *Sepia*, *Clio*, *Lernæa*, *Scyllæa*.

ε. *

An anterior mouth: body pedated, or furnished with feet.

Genera:—*Aphrodita*, *Nereis*.

ζ. *

A central mouth below.

Genera:—*Medusa*, *Asterias*, *Echinus*.

III. TESTACEA.

*

Multivalves.

Genera:—*Chiton*, *Lepas*, *Pholas*.

* *

Bivalves: Conchæ.

Genera:—*Mya*, *Solen*, *Tellina*, *Cardium*, *Mactra*, *Donax*, *Venus*, *Spondylus*, *Chama*, *Arca*, *Ostrea*, *Anomia*, *Mytilus*, *Pinna*.

* * *

Univalves with a regular spire: Cochleæ.

Genera:—*Argonauta*, *Nautilus*, *Conus*, *Cypræa*, *Bulla*, *Voluta*, *Buccinum*, *Strombus*, *Murex*, *Trochus*, *Turbo*, *Helix*, *Nerita*, *Haliotis*.

* * * *

Univalves without a regular spire.

Genera:—*Patella*, *Dentalium*, *Serpula*, *Teredo*, *Sabella*.

IV. LITHOPHYTA.

Genera:—*Tubipora*, *Madrepora*, *Millepora*, *Cellepora*.

V. ZOOPHYTA.

*

Fixed.

Genera:—*Isis*, *Gorgonia*, *Alcyonium*, *Spongia*, *Flustra*, *Tubularia*, *Corallina*, *Sertularia*, *Vorticella*.

*

Locomotive.

Genera:—*Hydra*, *Pennatula*, *Tænia*, *Volvox*, *Furia*, *Chaos*.

The progress of zoology soon demanded a reform of a class so constituted. Pallas led the way, and the observations of O. F. Müller and Otho Fabricius, by making us acquainted with numerous species of true marine worms, greatly conduced to its rectification. To Cuvier however we are indebted for the first clear circumscription of the *Vermes*. In his work entitled 'Tableau Elementaire de l'Histoire Naturelle des Animaux,' published in [illegible], he limited the term to the animals now known as *Annelides* and *Entozoa*. Afterwards, on discovering red blood in the leech, he separated those groups, and Lamarck in adopting the views of Cuvier, constituted the group Annelides in the sense it is now generally used. They are however nearly-allied families, and [illegible] species which closely link them together. The distinction founded on the colour of the blood has been abolished by subsequent researches, Annelides having been discovered with yellow and even green blood, and Planarians having the circulating fluid of a red colour.

The history of the now obsolete class of *Vermes* is interesting to the philosophical naturalist, since to him it symbolises the progress of zoological science. At first, with few materials on which to build his arrangement, the zoologist was guided solely by a vague perception of analogy. Similarities of external form were made the basis of classification. The distinction between the resemblances of animals adapted for existence under similar conditions of the earth's surface and their relations to each other according to their organization, correspondent with their position in the series, could not be expected to strike the naturalist when his data were as yet so scanty. But as the discovery of species, the observation of their distribution and habits, and the anatomical investigation of their structure progressed, a new light opened on his mind, and he learned to separate forms merely analogous and to combine such as had a true affinity of structure in well-defined divisions. The changes in the divisions of his [illegible] *Vermes* made successively by Linnæus himself indicate the progression of his views towards the point afterwards reached by Cuvier and Lamarck; and if we investigate closely the ideas by which he appears to have been influenced in the construction of his several orders of *Vermes*, we shall find hints of much that is not yet fully worked out. The analogy subsisting between *Nudibranchiata* and the *Annelida* is of this kind. His recognition of the relations of the *Tunicata* to the *Testacea* was also a remarkable instance of the prescient sagacity of that extraordinary man.

VERMETUS. [TUBULIBRANCHIATA.]

Mr. J. E. Gray makes the *Vermetidæ* comprise the genera *Vermetus*, *Spiroglyphus*, *Bivonia*, [illegible] [illegible]*tina*, *Lementina*, and *Siliquaria*.

He places the family between the *Valvatidæ* and the *Vanicoroidæ*, the latter of which only consists of the genus *Vanicoro*. (*Synopsis Mus. Brit.*, 1842.)

VERMICELLI, a dried paste, manufactured chiefly in Italy in the form of smooth round strings. The name has been given to it on account of its worm-like appearance, 'vermicelli' in Italian signifying 'little worms.'

Maccaroni, which the Italians spell Maccheroni or Maccherone (a word of doubtful etymology), is manufactured of the same kind of paste as vermicelli, and in a similar manner; but it is rather larger in diameter, and is hollow like the tube of a tobacco-pipe.

Fedelini is a kind still smaller than vermicelli.

The paste is made of wheat stripped of the husk, and ground roughly into a sort of grit. The kind of wheat preferred by the Italians is a small hard-grained species which they now cultivate on purpose, but which they formerly imported from the coasts of the Black Sea—'grano di Mar Nero.' The ground wheat is mixed with clear soft ter, and made into a paste by kneading it on a large ck with a wooden lever ten or twelve feet long. The rt end of the lever is made sufficiently heavy to lift the g end, on which one or two men or boys get astride, l alternately sitting down and springing up, work the ste for a long time. The toughness and elasticity of the ste result from this long and powerful process of knead- . The paste is next forced by strong pressure through nd holes in the bottom of a cylinder; but, to form ccaroni, a wire extends from a bridge in the upper part the cylinder through the centre of each of the largest es, and the paste, being forced through each hole around wire, is consequently hollow. The strings, several in length, whether of maccaroni, vermicelli, or fedelini, ing been thoroughly dried, are ready for use.

he Italians manufacture the paste into many other s; into thin flat strips like ribbons, into thin sheets paper, into round balls, and into beans and peas. Neapolitans, who use great quantities of maccaroni heir favourite food, use nothing but the pure paste of t and water, but the Genoese mix saffron with it, h gives it a yellow tinge. The French, who also facture a good deal of it, frequently season the paste various condiments.

the late tariff the duty on vermicelli and maccaroni reduced from 2*d.* to 1*d.* a pound. The average quan- imported yearly under the old duty was about 000 lbs., the amount of duty obtained annually being 1 2000*l.* to 3000*l.*

enny Magazine, No. 87; *Dictionnaire Technolo- ue.*)

ERMICULITE. This is described by Dr. Thomson as posed of micaceous-looking plates cemented together whitish matter. Lustre soapy. Feel greasy. Sec- Hardness 1. Specific gravity 2·5252.

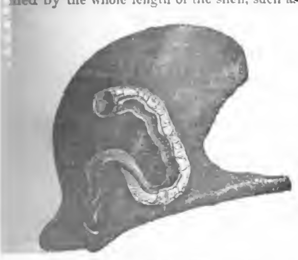
hen heated nearly to redness it projects out with a icular motion, as if it were a mass of small worms: e the name. By ignition it becomes of a silvery t, with a shade of red or yellow.

usible *per se* before the blow-pipe. With carbonate da in the reducing flame gives a greenish, in the oxi- g flame an amethyst-coloured glass.

Thomson's analysis gave—

Silica	49·080
Magnesia	16·964
Peroxide of iron	16·120
Alumina	7·280
Water	10·276
Manganese	a trace
	99·720

RMILIA, Lamarck's name for a genus of *Serpulidæ* COLÆ], composed of species of *Serpula* which are hed by the whole length of the shell, such as *Serpula*



Vermilia triquetra.

rmilia) *triquetra*, the shell of which is repent and uous, with a simple dorsal carination: there is a variety a red line on each side of the carination.

ocality.—European and Mediterranean seas, on stones, ls, and other submerged marine bodies.

ERMILION. [MERCURY.]

ERMLAND. [SWEDEN, p. 301.]

ERMONT, one of the United States of North America, tuated between 42° 44′ and 45° N. lat., and between 71° 30′ and 73° 28′ W. long. It is about 80 miles distant from the Atlantic, from which it is separated by New Hampshire and Maine. Its northern boundary runs along 45° N. lat., by which parallel it is separated from Lower Canada: this line is about 90 miles long. East of Vermont is New Hampshire, which is divided from it by the course of the river Connecticut in all its extent, a space of 170 miles, following the bends of the river. South of Vermont lies Massachusetts, from which it is separated by a straight line 44 miles long. New York is west of Vermont. The boundary-line between these two states south of Lake Austin runs along 73° 15′, for about 45 miles, and farther north through the lake and along the course of the river Poulteney to its embouchure in Lake Champlain, a distance of 45 miles. The last-mentioned lake constitutes the remainder of the boundary-line between the two states as far north as 45° N. lat., or for about 100 miles. The length of this state from south to north is 157 miles, and its breadth varies, increasing as we proceed to the north. In the southern part it is not more than 30 miles wide, but near the boundary of Canada it is 90 miles. The mean width is about 62 miles: this gives a surface of 9734 square miles, which agrees tolerably well with the most recent estimate, according to which its area is stated to be 9800 square miles. It is the largest of the New England states, with the exception of Maine, and may be compared in extent with that portion of England which lies north of a line drawn from the town of Lancaster to the innermost recess of the Humber.

Surface and Soil.—Vermont constitutes a part of that irregular mountain-region which extends over the greater part of that portion of the United States which lies east of the River Hudson, and of Lake Champlain. The surface is very uneven, and even mountainous. A range of mountains traverses the country from south to north, called the Green Mountains: this range is sometimes considered a continuation of the Taghhanic Mountains, which farther south form the boundary between Massachusetts and New York, and extend nearly to the shores of Long Island Sound; but according to the most recent maps the two ranges are divided by a depression of several miles, in which the boundary-line between Massachusetts and Vermont lies. From this depression the Green Mountains rise at a short distance east of Bennington, and form one continuous ridge running from south to north about 75 miles, to near 44° N. lat. Their width in these parts varies between 8 and 10 miles. The slopes are rather gentle, but more so on the east than on the west, where in many places they are steep. In general they do not rise to more than 2000 or 2500 feet above the sea, on a base which on the west may be 300 and on the east 500 feet above the sea. The highest summit is Killington Peak, which is south of the road leading from Windsor on the Connecticut river to Rutland, and rises to 3378 feet above the sea-level. The summits of the mountains are rocky, and only covered with a spongy green moss, from which circumstance it is supposed the name of the range is derived. The sides are covered with forests of evergreen-trees, especially pine, spruce, and hemlock, which near the base of the mountains attain large dimensions, but towards their summits are only from two to three feet in height, and their branches are so closely interwoven as to form an impenetrable thicket. No part of the slopes of the mountains is under cultivation, and only a few tracts are used as pasture-ground.

The country surrounding the Green Mountains on the south is of indifferent quality. The soil is chiefly stony and gravelly, but as it is well drained, it is used as pasture-ground, especially for sheep. The greater part is still covered with beech, sugar, maple, elm, oak, button-wood, bass-wood, ash, and birch: a number of swine are fed in these forests. In proceeding northward the country improves. The soil is less stony and contains a larger proportion of loam or clay. The cultivated tracts are more numerous and extensive, and the crops more abundant, especially along the banks of the Connecticut river, where some very fertile tracts occur. In these parts a solitary summit, Mount Ascutney, rises near the town of Windsor, to 3320 feet above the sea-level.

Near 44° N. lat. the mountain-region spreads farther east and west, so that in the parallel of Montpelier (44° 10′ N. lat.) it is 20 miles wide, and between Richmond and Danville about 40 miles, occupying more than half the width of the country. Between 44° and 44° 30′ the different ridges do not appear to lie in the direction of the chain; some of them lie south-west and north-east, and others in other directions. These ridges are also broken by watercourses. The most eastern ridge is the lowest, but is not broken, and it forms the watershed between the basin of the Connecticut river and the streams which run eastward into Lake Champlain. In the ridges which traverse the interior of this mountain-tract are the highest summits of the Green Mountains. Camel's Rump, west of Montpelier and south of the river Onion, is 3399 feet above the sea-level, and Mount Mansfield, north of Montpelier, 3900 feet. This mountain-region is perhaps the most fertile portion of Vermont. Though the mountains themselves do not differ in their natural qualities from the range farther south, and are not fit for cultivation on account of the steepness of their slopes, they occupy only the smaller part of the tract, perhaps not more than one-fourth. Between them are valleys of considerable extent, which are very fertile, as the lower part is filled up by earthy particles brought down from the adjacent mountains by the rivers and torrents, and containing a large proportion of mould. Though these valleys are probably more than 500 feet above the sea-level, their climate is favourable to cultivation, as they are enclosed by ridges rising from 1000 to 2000 feet above them, and sheltering them against the cold northern and north-western winds. The lower part of the mountains is covered with large trees, from which great quantities of pearlashes are obtained.

.North of 44° 40′ the mountain-region narrows to about 20 miles, and its sides are enclosed by two uninterrupted ridges, of which the western, occupying about the middle of the state, runs nearly due north, extending along the western banks of Lake Memphramagog into Canada, where it terminates on the great Canadian Plain, not far from the banks of the St. Francis river, about 45° 25′ N. lat. The eastern ridge runs north by east, from 10 to 5 miles from the banks of the Connecticut river, and enters Canada near the sources of that river, whence it turns to the north-east, and forms the boundary-line between New Hampshire and Maine on one side, and Canada on the other side, until it reaches the sources of the St. John river of New Brunswick. Both ridges appear to attain an elevation of 2000 to 2500 feet above the sea-level. The tract enclosed by these two ridges is much inferior to the region farther south. The valleys are rather narrow and contain only a comparatively small portion of cultivable land, but as the hills are not very steep nor elevated, they are covered with tall forest-trees, and afford good pasture in most places. The tract of country which lies between the eastern-ridge and the Connecticut river is very hilly and broken, and is certainly the least fertile part of the state. Its elevation above the sea-level can hardly be less than 1000 feet, and it has a bad climate and a poor soil, consisting mostly of rocks and coarse gravel.

The most level part of Vermont is that which lies on the banks of Lake Champlain, and may be called a plain, though the surface is broken by numerous watercourses, which however do not sink much below the common level. Near the banks of the lake are some tracts, which are very little above the waters of the lake, and are swampy. At the back of them the country rises gradually to the base of the mountain-region, and becomes hilly in approaching it, but the hills have such gentle slopes as to admit of cultivation almost everywhere. At the base of the mountains the general elevation of this tract probably does not exceed 300 feet above the sea-level, whilst near the banks of the lake it sinks to 100 feet. This plain is about 100 miles long, and in its southern districts less than 10 miles wide, but towards the north it widens to 30 miles. The soil varies greatly, consisting in many places of coarse gravel, while at others it contains much clay or loam, but a large portion of it is productive. It enjoys also the advantage of an easy means of exporting its produce by the lake and the Sorel river, by which way it is sent to Montreal in Canada.

Lakes and Rivers.—More than two-thirds of the drainage of Vermont runs into Lake Champlain, which is navigable by large vessels. [CHAMPLAIN, vol. vi., p. 479.] The largest rivers falling into that lake are Otter creek, Onion river, Lamoille river, and Missisqui river, of which however only the first and last are navigable and navigated. Otter creek rises on the western declivity of the Gr Mountains, near 43° 15′ N. lat., and runs north by nearly parallel to Lake Champlain, draining the part of the fertile plain on the east of the lake. Its probably exceeds 70 miles, and vessels may ascend Vergennes, about eight miles from its mouth, where first falls occur. Other falls are met with at Pittsford, and Rutland, but the distances between are navigated by river-boats. Onion and Lamoil originate in the mountain-region of the centre; an descend from a high level and have only a short their current is very rapid and frequently inter falls, so that no part of them is navigable. Missisqu rises in Canada, and at first flows southward, par Lake Memphramagog. In approaching Vermont westward, but soon afterwards enters that state by a western course. At Sheldon, about 10 miles mouth, it becomes navigable for river-boats, and Missisqui Bay, the north-eastern arm of Lake which is about 15 miles long and 3 wide, and extent navigable for such vessels as are on the lake. The northern portion of within Lower Canada.

A few small rivers which drain the north the mountain-region fall into Lake Mem which about one-fifth part lies within lake has a curved form: it is nearly 30 miles no part exceeds two miles in width. It is by mountains covered with forest-trees, and its waters into the St. Francis river of Canada by nel which is called Magog. This river runs miles, and enlarges about the middle of its small lake called Seaswaninepus, but otherwise is interrupted by numerous falls and rapids. Lak phramagog contains several kinds of fish, salmon-trout.

The Connecticut river, which runs between and New Hampshire for about 170 miles, is not in the upper part of its course, where it presents a nual succession of rapids and cataracts. The last of cataracts, which entirely prevent navigation, Barnet Falls, which occur near 44° 15′. Farther there are several small falls and rapids; but from hill (44° N. lat.) downwards the river is boats, at least in certain seasons. All the rivers into the Connecticut from the Green Mountains are and none of them navigable.

Climate.—Vermont is distinguished by the its winter, which is beyond what could be exp either latitude or elevation, and must be attributed northern and north-west winds which prevail season, and which before reaching this state pass wide plain of Canada, where their force is not their intensity moderated by any range of hills winter continues almost without interruption from of December to the beginning of April. The intense, and the thermometer sometimes descends as 27° below zero. The ice on the lakes and rivers where the rivers have rapids or cataracts, will be loads. At the same time a considerable quantity of falls. The spring lasts only about six weeks, middle of April to the end of May, and the weather mild and pleasant, with frequent showers. In from June to August, both months included, rain is except when brought on by thunderstorms, which rather frequent. In this season the heat in the the day is oppressive, as the thermometer rises above 80°, and sometimes even to 94°, but evenings and nights are cool and pleasant. The pleasant season here, as generally in the tempera is from the beginning of September to the October, the heat being then moderate, and the air elastic, and invigorating. About the middle of Octo change takes place: the rains begin to set in, and accompanied frequently with wind and snow. pleasant weather continues until the frost sets in nently. The mean annual temperature is 43½°, which only between two and three degrees higher than th Trondhiem (64° N. lat.), but agrees pretty well with of Kasan (55° N. lat.). The observations from which the results are drawn were made at Windsor (43° 38′ N.

Animals.—It does not appear that the puma, which l in the Essex Mountains of New York, occurs in the n Mountains. There are bears, black cats, wild-cats, red, grey, cross, and black foxes, hares, martins, es, porcupines, rabbits, racoons, skunks, several kinds irrels, weasels, and wolves. In the rivers and lakes eavers, minks, musk-rats, and otters. But all these als have diminished during the present century owing increase of population, and some of them are nearly ct. Fish is plentiful, especially in the lakes Cham- and Memphramagog, and abundance of salmon ally ascends the Connecticut river and comes into Champlain.

nerals.—Iron-ore is abundant along the western base e Green Mountains, and between them and Lake plain. At several places it is worked, but not on a scale. Sulphate of iron is abundant, and copperas is factured to some extent. There occur also ores of copper, zinc, and manganese, but they have not yet turned to any advantage. Marble of various kinds olours occurs on the banks of Otter creek, and is d at Middlebury and some other places. There is ap-stone, slate, marl, rock fit for millstones, and other useful minerals.

lliams's *Natural and Civil History of Vermont*; 's *View of the United States*.)

islature and Government.—The legislature of Ver- consists of a senate and house of representatives. enate was not established till 1836. The senators , and are freemen, at least 30 years of age, elected lly, each county being entitled to at least one, he rest being apportioned according to population. ouse of representatives consists of 230 members, re elected annually by the townships. The pay of embers of each house is a dollar and a half per day the sitting of the legislature. The two houses have owers in all acts of legislation.

governor is chosen annually by the people. His is 1150 dollars. The lieutenant-governor is presi- of the senate. He is also elected annually, and es four dollars a day while presiding in the senate.

mont returns five members to the house of repre- ives of the Congress.

rts of Law.—The chief legal establishments are the ne Court, the Court of Chancery, and the County or t Courts, &c. The Supreme Court is a court for the ent of questions of law, petitions, and other matters mitted to a jury. This court, which sits once a year h county, consists of a chief-justice and four assistant , each having a salary of 1375 dollars a year. The of Chancery sits twice annually in each county. Each of the Supreme Court is chancellor of a circuit. An l lies from the Court of Chancery to the Supreme

The County Courts have five circuits, and sit twice in each county. Each County Court is composed judge of the Supreme Court, two assistant judges ch county, and justices of the peace, all of whom are n annually by the legislature. Each judge of the me Court is *ex officio* chief justice of the county of his circuit. The County Courts have exclusive liction in all cases submitted to a jury. In questions operty the value generally exceeds 100 dollars, but is in some cases. The punishment of death is inflicted es of murder, the taking away of life by arson, false- ring, &c. In cases not capital the court may impose e, but the punishment generally is confinement with labour. The assistant judges have no salaries, but paid by fees. There are also District Courts, in which ller causes are decided by justices of peace. The state- on, which was established in 1808, is at Windsor.

ducation, &c.—The common or district schools in mont are supported by a tax levied under a general of the state, and also by district taxes. Besides the mon schools, there are about 20 incorporated aca- ies, with about 40 students each. There are three ersities. Vermont University had in 1842 six in- ctors, 241 alumni, 101 students, and a library with volumes. [BURLINGTON.] Middleburg University, nded in 1800, had six instructors, 758 alumni, 53 dents, and a library with 7054 volumes. Norwich versity, established in 1834 by the Universalists, had en instructors and 40 students.

The Vermont Academy of Medicine at Castleton, founded 1818, had in 1842 six professors, 70 students (undergraduates), and 514 who had graduated. Vermont Medical School, at Woodstock, founded in 1835, had five professors, 76 students, and 166 graduates.

In 1840 there were 27 newspapers published in Vermont—1 at Bellows Falls, 1 at Bennington, 2 at Brattleborough, 2 at Brandon, 2 at Burlington, 1 at Chelsea, 1 at Danville, 2 at Johnson, 2 at Middleburg, 4 at Montpelier, 1 at Rutland, 2 at St. Albans, 1 at St. Johnsburg, 1 at Vergennes, 2 at Windsor, and 2 at Woodstock. Two of these were daily, the rest weekly.

Agricultural Produce.—In 1840 Vermont produced 495,800 bushels of wheat, 54,781 bushels of barley, 2,222,584 bushels of oats, 230,993 bushels of rye, 228,416 bushels of buckwheat, 1,119,678 bushels of Indian corn, 8,869,751 bushels of potatoes, 836,739 tons of hay, 29½ tons of flax, 4,647,934 lbs. of maple sugar, 48,137 lbs. of hops, 4660 lbs. of wax, 585 lbs. of tobacco, 4286 lbs. of silk cocoons. The produce of the dairy was valued at 2,008,737 dollars; the produce of the orchard at 213,944 dollars; the produce of the market-gardens at 16,276 dollars; the produce of nurseries and flower-gardens at 5600 dollars. The lumber produced was valued at 336,939 dollars, and 718½ tons of pot and pearl ashes were made.

The live stock in 1840 consisted of 62,402 horses and mules, 384,341 cattle, 1,681,819 sheep, 203,800 swine. The quantity of wool produced was 3,669,235 lbs. The value of the poultry of all kinds was estimated at 131,578 dollars.

Mineral Produce.—In 1840 Vermont produced 6743 tons of cast-iron and 655 tons of bar-iron from 26 forges. Of other metals the estimated value was 70,500 dollars. Of granite and marble the estimated value was 33,855 dollars.

Manufactures.—In 1840 there were 91 woollen manufactures, which produced goods worth 1,331,953 dollars. The cotton manufactories were only seven, which employed 262 persons. Only 33 men were employed in making hardware. There were 239 fulling-mills, 261 tanneries, 17 paper manufactories, 312 grist-mills, 1081 saw-mills. The total capital invested in manufactures was estimated at 4,326,440 dollars.

The total value of the imports (all by American vessels) in 1840-41 was 246,739 dollars; the value of the exports was 264,000 dollars, domestic produce, and 13,982 dollars, foreign produce, the total amount of exports being 277,982 dollars.

Banks, &c.—At the end of 1836 there were 19 banks in Vermont, with an aggregate capital of 1,304,530 dollars. In 1835 there were 3 fire-insurance companies.

Army.—The militia consists of 27 regiments of infantry. To each regiment is attached a company of artillery, one of riflemen, one of light infantry, and in some cases one of dragoons. The aggregate militia force, including officers, is 27,536 men. The governor is captain-general, and the lieutenant-governor is lieutenant-general.

Canals, &c.—There are are only three small canals in Vermont. White-river Falls, half a mile; Bellows Falls, one-sixth of a mile; and Waterqueenhy, four-tenths of a mile. In 1835 four railroad companies were incorporated. At the end of 1836 some movements had been made in surveying, but none of the roads had been commenced, and none of them appear to be yet opened. The total length of post-roads in the state is 2526 miles.

Population.—The population of Vermont in 1790 was 85,539; in 1800, 154,465; in 1810, 217,713; in 1820, 235,764; in 1830, 280,652; in 1840, 291,948, consisting of 291,218 white freemen and 730 coloured freemen. There are no slaves in the state. The average number of inhabitants to a square mile in 1840 was 29. In density of population Vermont is the 11th in proportion to the other states.

Vermont has no state-debt.

Political Divisions and Towns.—Vermont is divided into 13 counties—Addison, Bennington, Caledonia, Chittendon, Essex, Franklin, Lamoille, Orange, Orleans, Rutland, Washington, Windham, and Windsor. These are subdivided into about 230 townships, or 'towns,' as the Americans call them.

There is no large town in the state. *Montpelier*, the capital, and the seat of the legislature, is in 44° 17′ N. lat., 72° 36′ W. long. It is beautifully situated between two green and lofty hills, in a rich plain, on the north bank of the river Onion (or the Winowsky, as it was called by the

Indians). It consists chiefly of a broad street lined with fine trees on each side. The housse are for the most part neat and villa-like. There are only about 3000 inhabitants, but there are four places of public worship, well-built and commodious. The state-house, in which the houses of legislature hold their sittings, is a handsome building of fine-grained grey granite with a portico: it is surmounted by a dome of peculiarly graceful proportions. There is also a court-house and a prison. Montpelier is 524 miles from Washington, and 40 miles E. by S. from Burlington, travelling distances.

The other towns of most importance are—BENNINGTON. *Brandon*, on Otter Creek, about 40 miles direct distance S.S.W. from Montpelier, with about 2000 inhabitants. *Brattleborough*, on the west bank of the Connecticut. It is a flourishing place, with cotton manufactures and paper-mills. The Vermont Asylum for the insane, at Brattleborough, had, in 1841, 165 patients, of whom 70 were discharged, leaving Oct. 1, 1841, 95. Of those discharged, 41 were recovered, 25 were not recovered, and 4 died. Brattleborough is 110 miles S. from Montpelier, road-distance, with about 3000 inhabitants. BURLINGTON has now about 5000 inhabitants. *Chelsea*, 25 miles S.E. from Montpelier, road distance, with about 3000 inhabitants. *Danville*, 23 miles N.E., from Montpelier, with about 3000 inhabitants. *Johnston*, about 30 miles N. by W., direct distance, from Montpelier. *Middlebury*, 43° 50′ N. lat., 73° 10′ W. long., about 35 miles S.W. from Montpelier, direct distance, on both banks of Otter Creek, which is here 170 feet wide, with falls of 20 feet perpendicular height, affording water-power for many mills. There are several manufactures of woollen, cotton, nails, &c., and marble is quarried and wrought in considerable quantity. There are three churches, Congregational, Methodist, and Episcopalian, a court-house, and two academies. Middlebury College is pleasantly situated on elevated ground, consisting of a spacious stone edifice, 108 feet by 40, four stories high, with 50 rooms for students, and a wood-building 3 stories high, with 20 rooms for students. *Rutland*, on Otter Creek, about 50 miles S.S.W., direct distance, from Montpelier, with about 3000 inhabitants. *St. Albans*, about 50 miles S.W., direct distance, from Montpelier, with about 2500 inhabitants. *Vergennes*, on Otter Creek, near Lake Champlain, about 30 miles W.S.W. from Montpelier, with about 2000 inhabitants. *Windsor*, on the west bank of the Connecticut, 61 miles S. by E., road distance, from Montpelier. It is a flourishing and rather handsome town, with some manufactures, and about 4000 inhabitants. *Woodstock*, 14 miles N.W. from Windsor, on an affluent of the Connecticut, has between 3000 and 4000 inhabitants.

History.—The tract of country between Lake Champlain and Montpelier, called Vermont by the French settlers from its green mountains, was ceded by them to the British in 1763. The French had commenced their settlement as early as 1731, and the provincial government of Massachusetts had built a fort on the west bank of the Connecticut in 1724; but as the natives were numerous and hostile, little progress was made in colonizing Vermont till after the British had conquered Canada in 1760, after which time it began to be settled rapidly. Vermont was at first claimed by Massachusetts, and afterwards by New Hampshire and New York; the rival claims were decided by the king of England in council in 1764, in favour of New York. A serious quarrel was the result of this decision, which was iuterrupted by the war of the Revolution, in which 'the green-mountain boys,' as they were called, distinguished themselves by their hardiness and bravery. In January, 1777, they declared the state independent, but New York still claimed jurisdiction, which the green-mountain boys resisted. The differences however were finally adjusted in 1790 by Vermont paying to New York 30,000 dollars in full of all demands. In 1793 Vermont was admitted into the federal union.

('*American Almanacs*, 1830, 1835, 1837, 1841, 1843; *Encyclopædia Americana*; Buckingham's *America*, vol. iii., 1842; *Geography of America*, published by the Useful Knowledge Society, 1841.'

VERNAL, VERNAL EQUINOX. The word vernal is the adjective derived from *ver*, the spring; and the vernal equinox is that point of the equator which the sun crosses when it passes into the hemisphere of the observer, and when his days begin to be longer than the nights. Consequently that point of the ecliptic which is called the first point of Aries is the vernal equinox to those in the northern hemisphere, while the first point of Libra is the same to those in the southern. If there were any decidedly astronomical nations south of the equator, some confusion might perhaps have arisen; but as all the science will be carried from the north, it is probable that the terms and modes of measurement peculiar to the north will be universally retained.

VERNATION, in Botany, signifies the manner in which the young leaves are arranged within the leaf-bud. It is equivalent to the expressions foliation and præfoliation. It corresponds also to the terms æstivation and præfloration, which indicate the manner in which the parts of the flower are arranged in the flower-bud. The distinction of the various modes in which the leaves are arranged one upon another in the leaf-bud is of great practical value, although at present little attention has been paid to it by botanists. Not only are many species and genera of plants thus distinguished, but even natural orders. Thus the Ferns and Cycadaceæ may be recognised by a circinate vernation, whilst the *Prunus cerasus* has a conduplicate, and the *Prunus domestica* a convolute vernation. The terms which apply to æstivation are also applicable to vernation. When the edges of the leaves are rolled inwards spirally on each side, as in the apple, the vernation is said to be *involute*. When the leaves are rolled backwards on each side, as in the rosemary, it is revolute. When the margin of one leaf alternately laps over the opposite, it is *obvolute*. When one edge is rolled inwards and is enveloped by the opposite edge rolled in an opposite direction, as in the leaves of the apricot, it is *pervolute*. When the leaves are folded lengthwise like the plaits of a closed fan, as in the vine and many palms, it is *plaited*. When the leaves overlap each other in a parallel manner at the margins, without any involution, it is *imbricated*. When they overlap each other entirely, as in the iris, it is *equitant*. When the leaves are rolled spirally downwards, as in the ferns, it is *circinate*. When applied to each other by the margins only, it is valvate.

VERNET, CLAUDE JOSEPH. This celebrated landscape and marine painter was born at Avignon, in 1714, and received his first instruction in painting from his father, Antoine Vernet, and Adrian Manglard, an historical painter. Fiorillo states, Vernet is said, even in his fifth year, to have had great skill in drawing. At the age of eighteen, in 1732, he went to Italy with the intention of perfecting himself as an historical painter, but the beautiful views of sea and shipping at Genoa, Naples, and other parts of Italy are said to have induced him to fix upon marine landscape as his principal study. He studied under Fergioni at Rome, and his future pictures justified his choice, for he executed works which acquired him a name comparatively early in life, that rivalled those of Claude and Backhuyzen. But he for some time in Italy lived in great poverty; he was glad to paint in any way and for the slightest remuneration; at the sale of the collection of M. de Julienne, a piece was sold for 5000 livres which Vernet had painted in Rome for a suit of clothes. He painted also several panels of carriages for coach-builders at low prices; they were afterwards taken out and framed as works of great value. He remained in Italy twenty years, including some time spent in Greece and the Greek islands; and during this period he made elaborate sketches of many of the most beautiful and most interesting spots in both countries, and painted also several admirable pictures in Genoa, in Naples, and in Rome. Those which he painted in Rome for the palaces Rondanini, Borghese, and Colonna are among his best works: the pictures he painted for the Rondanini palace were executed much in the style of Salvator Rosa, whom Vernet imitated with great success; but he afterwards entirely forsook Salvator's manner for one as conspicuous for its delicacy of colouring as the other was for its force. One of his first patrons in Rome, according to Pilkington, was Mr. Drake of Shardeloes in Buckinghamshire, who commissioned him to paint six pictures, leaving the subjects to his own choice, and he produced six excellent pieces.

In 1743 he was made a member of the Academy of S. Luke; and about the same time he married Miss Parker, the daughter of an English Roman Catholic, who was an officer in the pope's marine. Vernet's reputation as a marine painter at length reached his own country, and in

he was invited by Louis XV., through M. de Marigny,
uis, after an absence of twenty years, if the dates men-
d in this notice are correct: but the 'Biographie Uni-
elle' and other works state that he remained twenty-
years in Italy; yet if this be the case, as he returned to
ce in 1752, he either went to Italy in his sixteenth
, or was born in 1712, as is stated in the catalogue of
Louvre of 1814, but the former is more probable: it is
ever most likely that he remained only twenty years
aly.

ernet lost no time in complying with the invitation of
ing, and embarked as soon as possible at Leghorn in
all felucca for Marseille. During the passage there
pened a violent storm, which terrified some of the pas-
gers, but Vernet, struck with the grandeur of the effect
e sea, requested one of the sailors to bind him to the
t-head, that he might view it to the greatest advan-
e; and there he remained, lost to the dangers of his
ition, absorbed in admiration of the grand effect
und him, endeavouring to transfer it to his sketch-
k. His grandson, the celebrated Horace Vernet,
nted an excellent picture of this scene, and exhibited it
1816 in the Louvre. In 1752 or 1753 Vernet was
ted a member of the French Academy of Arts; his
ption picture was a Seaport at Sunset, which is now
he Louvre. In 1753 he was commissioned by the
rnment to paint pictures of the principal seaports of
ce, of which he painted fifteen views; an arduous task,
h occupied him nearly ten years, or twelve, according
e Catalogue of the Louvre: but it contributed more
is fame than to his fortune, for he was paid, including
travelling expenses, only 7500 francs each; and the
ures are of large dimensions, measuring eight French
long by five high: they are now in the Louvre. He
however in consequence of these works elected in 1706
of the council of the Academy, and Louis XV. gave
apartments in the Louvre. From 1752, when he
rned to France, until the year of his death, 1789,
net painted upwards of 200 pictures, most of which
e been engraved. The best prints after him are by
lechou, Lebas, Aliamet, and Flipart. He was without
ival in France, and there was only one landscape pain-
in Europe who disputed the palm with him: this was
hard Wilson, with whom Vernet had become acquainted
Rome, and had a great esteem for. They exchanged
ures, and Vernet kept Wilson's in his studio at Paris,
he is said to have remarked to English connoisseurs who
ted him, that they had no occasion to come to him for
ures when they had such a painter at home. Vernet's
lscapes are good in every respect, but he was most
ellent perhaps in his management of light and shade,
aërial perspective: his figures also are remarkably
l drawn, and he introduced a great number of them in
e of his pieces; he excelled also in moonlight effects,
l in representing water in any state, but particularly
en disturbed and boisterous. He was least successful
shipping: he was deficient in a competent knowledge
he rigging and construction of ships.

n 1814 there were only seven pieces by Vernet in the
lection of the Louvre, in 1827 there were forty-eight,
t there were only twenty-seven in 1837.

In 1826 the Athenæum of Vaucluse determined upon
ving a prize for the best eulogy in verse upon Vernet:
was decided in favour of M. Bignan, in 1827, in the
sence of the son and grandson of the painter, Carle
l Horace Vernet, who, in gratitude to the city of Avig-
n, each presented a picture to the museum of that
ce. Carle Vernet's was a horse-race at Rome; Horace's,
well-known picture of Mazeppa. The Municipal
ncil of Avignon, and the directors of the museum,
sented to the painters in return two large silver urns
bossed with two of their own designs respectively.

(Fiorillo, *Geschichte der Mahlerey*, vol. iii.; *Biographie
iverselle.*)

VERNEUIL. [EURE.]

VERNI'CIA, a name applied by Loureiro to a plant of
chin-China, which is well known as yielding an oil, and
ich belongs to the same genus as another plant, also
ding an oil, in China and Japan. By Thunberg the
er plant was called Dryandra, but that name being
ropriated to a genus of Proteaceæ, these oil-trees are
referred to the genus Elæococca of Commerson. This
ngs to the natural family of Euphorbiaceæ, and is characterised by having the flowers monœcious or diœcious. Calyx 2 or 3 partite; laciniæ valvate in æstivation. Petals 5, twice as long as the calyx, twisted. Stamens 10 to 12; filaments united at the base, the five outer ones shorter; anthers opening inwards, two often barren. The ovary in the female flower 3 to 5-celled; cells with one ovule. Stigmas 3 to 5, simple or bifid. Fruit fibrous and fleshy, within tricoccous to pentacoccous; cocci single-seeded. Both species form trees; leaves alternate, with long petioles, bi-glandular at base, entire, or the lower leaves lobed, smooth, or the younger ones hairy, flowers terminal, paniculate; peduncles jointed. *Elæococca verrucosa*, the Dryandra oleifera of Lamarck, and the D. cordata of Thunberg, is a native of Japan, where, he states, it is called Abrassin: the oil expressed from its seeds is used both as an article of diet and for affording light. The Chinese are said to call the oil Mouyeou, and the fruit from which it is obtained Mouyou. The tree cultivated in the Isle of France is there called Arbre d'huile, where an oil is likewise obtained by submitting the almonds of the seeds to pressure. E. montana, the Vernicia montana of Loureiro, is a native of China and Cochin-China: it yields a clear yellowish fatty oil, which is employed to protect wood from the influence of air and water. It is sometimes mixed with the real varnish of these countries, which it makes more liquid, but less valuable as a resin.

VERNIER. We shall give under this head a short account of the different methods employed to measure the parts of the divisions of astronomical and geodesical instruments. This and the article GRADUATION may be considered as a sort of introduction as well as supplement to the description of each particular instrument. It is necessarily both meagre and imperfect, but the references will point out the principal authorities to be consulted. We shall conclude with a brief account of the vernier in its simplest form.

We are not aware that the Greeks or their successors the Arabs had any contrivance for subdivision. They seem to have simply divided their circles as accurately as possible, and into small convenient portions. Ptolemy's catalogue does not profess to distinguish less quantities than 10′; or rather, the parts of degrees are marked fractionally with no larger denominator than 6. Ulug Beigh used instruments of greater dimensions, and seems from his catalogue to have noted minutes. At the revival of astronomy in Europe the instruments were very rude, and the simple division, aided by estimation, was probably considered sufficiently accurate without any artificial contrivance.

Peter Nonius, in the third proposition of his treatise 'De Crepusculis Olyssipone,' 1542, proposed the following graduation for astronomical instruments:—Forty-five concentric circles are to be inscribed on the limb, and separated into quadrants by diameters intersecting at right angles. The quadrants are then to be subdivided as follows:—the outermost into 90 equal parts, each of which consequently equals 1°; the next into 89, that following into 88, and so on to the innermost, which is to be divided into 46 equal parts. Each circumference is marked at a convenient place with the number of its subdivisions. The fiducial edge of the bar carrying the sights passes, when produced, through the centre, and the author assumes that whatever be the direction of the line of sight, the fiducial edge will cut some one of these circles at a division without sensible error. The corresponding angle in degrees, minutes, seconds, &c. is readily computed from the number of parts intercepted and the order of the circle. Thus if the exact coincidence takes place at division 29 of that quadrantal arc which is divided into 77 parts, the corresponding arc in degrees is $\frac{29}{77}$ of 90°, which is, when reduced to its ordinary denomination, 33° 53′ 46″ very nearly.

Tycho applied the graduation of Nonius, or a modification of it, to some of his earlier instruments, but 'quia hæc subtilitas, cum ad praxim deventum est, plus habeat laboris quam fructus, neque id in recessu præstet, quod primâ fronte pollicetur,' he abandoned it, and adopted the method of *transversals*, which is well known to most of our readers as the diagonal scale in the case of drawing-instruments. This Hooke says (*Animadversions*, &c.) 'was first made use of in England by the most skilful mathematician Richard Cantzler.' Tycho describes this mode of subdivision in the Supplement to his 'Mechanica,' Norimbergæ, 1602. Two concentric circles are drawn upon the limb at about $\frac{1}{10}$ of the radius from each other, and divided into equal parts of 10′. The space from the zero of the inner circle to the 10′ division of the outer circle is divided into 10 equal parts by 9 fine dots; and in like manner the space between the 10′ of the outer circle and the 20′ of the inner, and so on. These rows of points form a sharp zigzag with the angles in the two circles. The index, which may be either a fiducial edge or a fine hair, will pass over or near one of these dots in every position, and the angle to be read off is the number of degrees and tens of minutes which is taken from the circles, inner or outer, + the number of minutes and parts of a minute (the latter by estimation) reckoned by counting the points from the preceding angle. Tycho became acquainted with this division by diagonals as applied to straight lines when a student at Leipzig, and in the place above referred to he proves that this subdivision, though not theoretically exact when applied to curved lines, was yet sufficiently true for his purpose. Instead of dots, other astronomers struck nine concentric circles at equal distances, and then drew straight lines where Tycho placed his dots.

In the year 1631 Pierre Vernier, Capitaine et Chastellain pour sa Majesté au Chasteau Dornans, &c., published at Brusselles 'La Construction, l'Usage, et les Proprietez du Quadrant nouveau de Mathematique,' which he dedicated to the Princess Isabella. He supposes a quadrant divided into half-degrees on the limb, the surface of which rises above the plane of the instrument (this he calls the base), and a moveable plate of the form and figure of a sector (and so named by him), which is concentric with and exactly fitted within the limb, the surfaces of the two forming one plane. An arc of 15° 30′ is then set off on the sector, which is subdivided into thirty equal parts. He directs two lines of sight to be fixed on the extreme radii of the sector, which therefore include an angle of 15° 30′, and orders the division to degrees and half-degrees to be numbered one way on the limb from left to right, and the divisions of the sector to be numbered up to 30′ from right to left. Suppose the line of sight towards the zero end of the quadrant to be directed to any object:—If the division 30′ on the sector (we will now call this the *vernier*), which answers to the line of sight, seems to be a continuation of a division of the quadrant, the angle read off will be that degree, or half-degree of the quadrant, and the 0′ of the vernier will exactly correspond to another division of the quadrant. No other division of the vernier will so correspond if the division be exact. Now it will easily be seen that as the arc of 15° 30′ is divided on the vernier into 30 equal parts, each part is equal to 31′; and therefore that when 0′ is placed opposite a division of the quadrant, the division 1′ of the vernier overshoots the next division of the quadrant 1′ in the direction of the vernier, and contrary to the numbering of the limb. If the line of sight were pushed forward 1′, the vernier division of 1′ would therefore agree with a division in the quadrant, and so on; so that in fact, whatever be the position of the line of sight, the true angle is to be read off, first as to degrees and half-degrees from the quadrant, and then for the minutes from the vernier.*

In 1643 Benedictus Hedræus published at Leyden his 'Nova et Accurata Astrolabii Geometrici, nec non Quadrantis Astronomici Structura,' dedicated to his sovereign, Queen Christina of Sweden. In his preface he objects to the inaccuracy of Tycho's method of transversals, and gives himself a correct construction, viz. by describing a circular arc through 10′ of the outer division, 0′ of the inner division and the centre of the quadrant, and dividing that portion which is included between the inner and outer circles into ten parts, when the subdivision will be true. Hedræus has adopted the vernier, but without naming the inventor: his astrolabe and quadrant are well contrived.

Hevelius applied to his instruments the transversal division of Tycho as well as the vernier. He seems to claim the invention of the tangent-screw for giving a slow motion to his line of sight, and dwells at great length on the subdivision of the larger divisions by the revolution and parts of the tangent-screw. (*Machina Cœlestis*, Pars Prior, cap. xv., Gedani, 1673.) So far as we can judge from his assertions and description, he arrived at great excellence in this part of mechanical construction, which however his unaccountable rejection of telescopic sights rendered of little value.

The next year after the appearance of Hevelius's book Hooke published at London his 'Animadversions on the first part of the 'Machina Cœlestis' of the honourable, learned, and deservedly famous astronomer Johannes Hevelius,' a tract distinguished by its acuteness and originality. It is remarkable that he did not see the merit of Vernier's invention,* nor, as it would seem, of Hevelius's application of the revolutions of the tangent-screw to measuring very minute quantities. He suggests a very elegant application of the diagonal scale, with rules for its accurate division when applied to circular arcs, but recommends racking the outer edge of the quadrant and measuring the angle by the revolutions and parts of the screw which carries the telescope by working in the racked limb.

Hooke's unlucky idea was carried into execution in Flamsteed's sextant, and turned out so ill that the diagonal division was applied as an after-thought. See his prolegomena (*Historia Cœlestis*, vol. iii., p. 106, and Baily's Flamsteed.) Hooke's advice was afterwards followed in making a quadrant for the Greenwich Observatory, which was also found to be useless. In the mural arc which Flamsteed erected at his own expense and under his own direction, he drew diagonals after having divided the inner and outer arcs to 5′. The subdivision was performed by dividing the fiducial edge of the index, not into five equal parts, but into such parts as would give the minutes exactly, and each of these was divided into six equal parts; so that the instrument read off to 10″, and by estimation to 5″. The outer edge was also racked after Hooke's method, but rather, we think, as a check against erroneous reading, than as a means for exact measurement.

Römer proceeded in a totally different manner. The limb of the circle was divided to 10′, and a magnified image of each division was formed in the focus of a microscope, so as exactly to fill the space between eleven threads at equal intervals. Thus the arc was read off to minutes by the threads and the seconds estimated, which they easily might be to 5″, according to Horrebow.

The vernier appears to have come into general use after Flamsteed's time, and in the larger quadrants there were usually two sets of divisions, one into 90° and the other into 96 parts, each with their peculiar vernier: the approximate divisions were brought into exact coincidence and the quantity measured by the revolutions and parts of the tangent-screw, after Hevelius's method. Such were the mural quadrants at Greenwich and elsewhere, erected by Bird, Ramsden, &c., in the last century; and the portable astronomical quadrant had the same or similar contrivances for subdivision. In the sector employed in the French survey, and described in 'La Méridienne de Paris verifiée,' Paris, 1744, the arc was divided by fine points to every 10′. In making the observation the plumb-line was first brought directly over one of these dots, and the star afterwards bisected by a micrometer-screw carrying a wire in the focus of the telescope. The degrees and tens of minutes being read off on the limb, the revolutions and parts of the screw furnished the remaining minutes and seconds. This method of subdivision was applied by La Caille to the sextant with which he observed at the Cape of Good Hope and at Paris. The invention is due to the Chevalier de Louville, whose memoir is to be found in the 'Mémoires de l'Académie' for 1714.

We have already mentioned Römer's optical method of subdivision. The invention of the micrometer-microscope, in which the divisions are first magnified and the intervals measured by the revolutions and parts of a screw carrying a wire or cross-wires in the focus of the object-glass of the microscope, is due to the duke de Chaulnes, whose account was published in 1768: 'Description d'un Microscope et de differents Micrometres,' &c. The reader find some account of the construction and verification e micrometer-microscope in the article CIRCLE.

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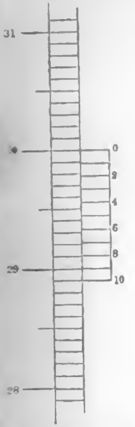
* Vernier's tract is very scarce, and the injustice of those writers who persisted in giving the name of Nonius to his invention has induced us to enter into a more particular exposition of both principles. The second line of sight is merely to enable the observer to extend the angle to 90° without carrying the sector beyond the quadrant. He gives a very prolix account of the graduation proper for quadrants and astrolabes of different sizes, and how angles exceeding 90° are to be measured, but of this no farther notice is required here.

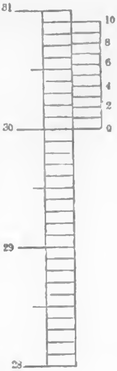
* Hooke conjectures that Tycho had invented Vernier's contrivance and rejected it, but without any probability. Tycho's words and figure refer clearly to some change of Nonius's divisions.

e will now briefly explain the principle of the vernier simplest form. If that be well understood, the reader ave little difficulty in making out the value of the ons in any instrument to which the vernier is applied, gh he may require considerable practice before he e to read off well and quickly.

No. 1.



No. 2.



ber 1 is the figure of a vernier for measuring hun- of an inch, such as is usually applied to common ters. The scale is on the left hand, on which the and tenths are marked. The portion on the right which can be slipped up or down, remaining always act with the scale, is the vernier. It is merely a of 11 parts of the principal scale divided into 10 parts. Each of these parts therefore equals $\frac{11}{10}$ of an · 11 and the difference between a part of the scale part of the vernier is ·01 inch. In the figure the the vernier is made to coincide, *i.e.* to form one ed line with the division 30 on the scale, and conse- 10 on the vernier also coincides with 28·9 on the Division 1 on the vernier is, from what we have ·11 inch below the zero of vernier, while the next lower on on the scale is only ·10 below it: hence the vernier on 1 is .01 inch below the division 29·9 on the For the same reason division 2 on the scale is twice ch, or ·02 below 29·8 on the scale, and so on, the on the vernier overlapping those on the scale 10 on the vernier stretches over to exact coincidence 28·9 on the scale. Now suppose the vernier to be ·01 inch, it is evident that division 1 of vernier ncide with 29·9 on scale. If the vernier were raised h, the vernier division 2 would coincide with 29·8 le, and so on; so that in order to read off the hun- ths of an inch which the vernier zero advances beyond th in the scale, we have merely to see what vernier ion comes nearest to a division of the scale, and set down for the hundredth required.

This is the form which was given to the vernier by its ventor, in which the parts of the vernier are larger than ose of the scale, and in which the numbering of the rts of the vernier runs contrary to the numbering of the ale. But if, as in No. 2, the vernier has the length of ine divisions of the scale, and this is divided into ten qual parts, each part will be equal ·09 inch, while the visions of the scale are equal to ·1 inch. The vernier n this form is to be numbered *forwards*, as well as the cale. It is clear that raising the vernier ·01 will bring he division 1 of the vernier into coincidence; and so on, xactly as before; and therefore that the inches and tenths eing read from the scale, the hundredths are to be taken from the vernier. The reading both scales forward is some advantage in favour of the latter mode, while the size of the vernier divisions is larger, and consequently clearer, in the first. There might perhaps be some advantage in particular cases in uniting both verniers, as the reading would be made on two divisions and by two sets of independent subdivisions, but we do not remember to have seen this in actual use.

In modern astronomical and geodesical instruments the vernier usually reads forward. Sometimes, for greater compactness, the zero is placed in the middle of the vernier, and the graduation, after running on to the end of the vernier, is continued from the other end of the scale to the middle, and reads both backwards and forwards. There is a great liability to confusion in these verniers, which can only be avoided, at first, by guessing the value of the subdivision before reading the vernier. We prefer simple verniers, reading always forward with the zero at one end.

The ordinary subdivision in English instruments is to minutes, half-minutes, twenty seconds, and ten seconds. Thus if the circle be divided to 30′, and the vernier taken equal to 29 half-degrees, and then divided into 30, each part of the vernier will equal $\frac{29}{30}$ of 30′ or 29′, and the difference between a part of the circle and a part of the vernier be 1′. If the circle be divided to every 10′, and the vernier taken equal to 59 of these parts (= 9° 50′), and divided to 60, each part of the vernier will be $\frac{59}{60}$ of 10′, that is, will be equal to 590″ or 9′ 50″, and the difference between a part of the circle and a part of the vernier be 10″. This division is legible in circles of 8 inches diameter. In circles of 18 inches diameter we should still adopt the same division, as it is easy to estimate the difference, and less fatiguing to read an open division than a crowded one.

The continental artists generally make one circle turn closely, but freely, within another, and nearly in the same plane, as we have seen was directed by Vernier. The reading is much more pleasant and exact in this way. Troughton objected to it, that if a particle of dust should get between the circles it would necessarily grind and tear the edges of the circles, leaving a muddy and ragged ditch between them. We do not know whether this objection is confirmed by experience. The English artists generally place their verniers on thin plates which move upon the divided circles. There is some chance of rubbing, and a certainty of wearing, if the verniers press on the circle; and if they stand off from it they are awkward to read, with a chance of considerable error from parallax. The subdivision by the vernier seems to be preferred by the German artists in general to that by micrometer microscopes, which are in England universally applied to large meridian circles, and indeed to all considerable instruments where the fixing of the microscopes is not subjected to a varying effect of gravity. On the side of the verniers may be pleaded cheapness, and freedom from changes, such as those which the scale of a microscope suffers when the distance between the limb and the object-glass of the microscope, or the body of the microscope itself, from expansion or other cause, is altered. On the other hand, the micrometer microscope certainly admits greater magnifying power, keeps the observer away from the instrument, can be fixed with greater firmness, and remains more steady. It is not easy to fix a vernier firmly without running the risk of affecting the motion of the circle. On the whole we prefer the micrometer microscope, although it must be admitted that the perfection which the continental artists give to the centring of their circles and verniers may well cause a difference of opinion. For small instruments, and those which, like the declination circle of an equatorial, are placed under different strains in different positions, the vernier is indispensable.

There is difficulty very often in getting the proper light on the divisions. It is desirable that those of the vernier as well as those of the limb should appear sharp and black, and the divisions before and after that which is nearest to coincidence should be scrutinized in order to estimate the decimal or fraction which is wanted for perfect coincidence. A more perfect setting will generally be obtained by making the divisions before and after the coincident division equally discordant, than by attempting to get a perfect coincidence. The observer should be careful to view the divisions directly, and in the centre of the magnifier, or he will have an error arising from parallax which may be considerable.

The truth of a vernier in one respect, that of its embracing a proper portion of the limb, may be tried in different parts of the limb. If the circle be very excentric, this may give a little trouble at first, and be confounded with bad division. In ordinary cases however, if there are opposite verniers, and their extreme divisions sometimes overlap and sometimes fall short of the corresponding portion of the limb, the mean will be true although the excentricity is sensible. The number of verniers may be either two, three, or four, at equal distances. Two are absolutely necessary to get rid of excentricity, and three or four will also nullify any error, original or superinduced, which gives the circle an elliptic form. But it is not easy in all cases to apply these readings conveniently, and the fatigue of many readings is scarcely recompensed by a little superior accuracy, at least in well-made and well-divided instruments which are carefully handled.

VERNON, EDWARD, a distinguished English admiral, was born at Westminster, 12th Nov., 1684, and was the son of James Vernon, Esq., the descendant of an antient Staffordshire family, who was secretary of state from 1697 to 1700. Young Vernon was carefully educated, and is said never to have forgotten his Greek and Latin; but nothing that his father could say or do would keep him from the sea, and it was at last found necessary to allow him to exchange his classical studies for navigation and gunnery. He first served under Admiral Hopson in the Prince George, on the expedition which resulted in the destruction of the French and Spanish fleets at Vigo on the 12th of October, 1702. In 1704 he was present in Sir George Rooke's squadron at the sea-fight with the French off Malaga. The next year he was appointed commander of the Dolphin; and he was afterwards transferred, in 1707, to the Royal Oak; in 1708 to the Jersey, in which he was sent to the West Indies as rear-admiral, under Sir Charles Wager; to the Assistance, of 50 guns, in 1715; and to the Grafton, of 70 guns, in 1726. He was returned as one of the representatives for Penryn to George II.'s first parliament, which met in November, 1727; and he sat for Portsmouth in the next parliament, which lasted from 1734 to 1741. It was the part which he took in the House of Commons which is said to have occasioned his being sent, with the rank of vice-admiral of the blue, on the most memorable expedition with which his name is connected. He had rendered himself considerable in the House, according to Smollett, 'by loudly condemning all the measures of the ministry, and bluntly speaking his sentiments, whatever they were, without respect of persons, and sometimes without any regard to decorum.' This writer proceeds:—'He was counted a good officer, and his boisterous manner seemed to enhance his character. As he had once commanded a squadron in Jamaica, he was perfectly well acquainted with those seas; and in a debate upon the Spanish depredations, he chanced to affirm that Porto Bello, on the Spanish Main, might be easily taken; nay, he even undertook to reduce it with six ships only. This offer was echoed from the mouths of all the members in opposition. Vernon was extolled as another Drake or Raleigh: he became the idol of a party, and his praise resounded from all corners of the kingdom. The minister, in order to appease the clamours of the people on this subject, sent him as commander-in-chief to the West Indies. He was pleased with an opportunity to remove such a troublesome censor from the House of Commons, and perhaps he was not without hope that Vernon would disgrace himself and his party by failing in the exploit he had undertaken.' Vernon however, who set sail from Spithead with his six ships on the 23rd of July, 1739, completely succeeded; Porto Bello was taken on the 22nd of November, and was afterwards only abandoned for want of a sufficient land-force to keep it, after all the fortifications had been blown up. Vernon's next enterprise was the disastrous attempt on Carthagena in the spring of 1741, made famous by the graphic details given by Smollett, who was present in the fleet as a surgeon or surgeon's mate, in the concluding chapters of the first volume of his 'Roderick Random.' (See also his *History of England*, iv. 608, &c., 4to. edition.) This failure however did not affect the admiral's popularity in England: to the new parliament, which met this year, he was returned at once for Penryn, for Rochester, and for Ipswich. He made his election for Ipswich, and he was returned for the same borough to the two next parliaments which met in 1747 and in 1754. During the rebellion of 1745 Admiral Vernon was employed in guarding the coast of Kent and Sussex, a service in which he acquitted himself with his usual zeal and ability; but soon after this he got into a quarrel with the Admiralty about the appointment of a gunner, the result of which was that he was struck off the list of admirals. In the course of this controversy, or after it was over, he is stated to have written several pamphlets in his own defence; but their titles are not given in the common accounts. He died at his seat, at Nacton in Suffolk, on the 29th of October, 1757. Vernon appears to have been a brave, high-spirited, and honourable man, with an impetuous temper, which he could not or would not rein in.

VERNON. [EURE.]

VERNO'NIA, which has been named from W. Vernon, fellow of St. Peter's College, Cambridge, who collected many new plants in Maryland, inserted in the supplement to Ray's 'History.' The species are numerous, forming herbs or shrubs, in the tropical parts of the world, especially in Brazil; but several are found in India, and among them that which is best known. The genus has the heads few- or many-flowered, discoid. Involucre imbricated, shorter than the flowers, with the interior scales longest. Receptacle usually naked; corols regular; limb equaling the tube in length, with a cartilaginous callosity at the base, and a large epigynous disk. Pappus usually in two rays, seldom equal; the inner row setaceous, and longer than the outer one, which is usually chaffy. The leaves are alternate, seldom opposite, often glandular, and secreting volatile oil. Vernonia (Serratula, Roxb.) anthelmintica is a pretty, large, erect, annual species, common on dry uncultivated ground and rubbish in different parts of India, flowering during the cold season. The dark-coloured seeds are extremely bitter, and considered powerfully anthelmintic. They are also employed as an ingredient in compounds prescribed in snake-bites.

VERNONIA'CEÆ, a tribe of plants belonging to the natural order Compositæ. They are distinguished from Lactuceæ by their corolla, which is not ligulate, and from every other tribe by their style, which is the same as that possessed by Lactuceæ. There are several genera of plants belonging to this tribe, which are chiefly inhabitants of America: there are a few in Asia and Africa, but none in Europe. The most interesting genus is the type of this tribe.

VERO'NA, DELEGAZIO'NE DI, a Province of the Venetian division of the Lombardo-Venetian kingdom under Austria, is bounded on the north by the Italian Tyrol, east by the provinces of Vicenza and Padua, south by the provinces of Rovigo and Mantua, and west partly by Mantua and partly by the lake of Garda, which separates the northern part of the province of Verona from the province of Brescia. The length of the province is about [illegible] miles from north to south, and its greatest breadth is about 25 miles. The population was stated in 1833 by Serristori, in his 'Statistica,' to be 278,000 inhabitants. The northern part of the province is hilly, and even mountainous near the borders of the Tyrol: the highest summit of Monte Baldo is above 6000 feet high. The southern part merges into the great plain of the Po; but the territory of Verona does not touch that river, its southern boundary being marked by the Tartaro or Castagnaro, an affluent of the Adige, which divides it on that side from the province of Mantua. The province of Verona is divided into thirteen districts, namely, Verona, Villafranca, Isola della Scala, Sanguinetto, Legnago, Cologna, Zevio, S. Bonifacio, Illassi, Badia Calavena, S. Pietro in Cariano, Caprino, and Bardolino.

The river Adige crosses the province of Verona in its length from north to south-south-east. It runs through a very narrow valley from the frontiers of the Tyrol down to the defile of Chiusa, near Rivoli, after which it emerges into the plains of Lombardy. The province of Verona has few towns of any consequence besides the capital. Legnago is a fortress of considerable strength, on the Adige, south of Verona; Villafranca is a bustling market-town on the road from Verona to Mantua; Rivoli, on the right bank of the Adige, north of Verona, is famous for the battle won by Bonaparte and Massena over the Austrian general Alvinzi, in January, 1797, which decided the surrender of Mantua, and confirmed the subjugation of North taly by the French. This country is full of the recollecions of those memorable campaigns. On the banks of he Alpone, near the wooden bridge of Arcole, is an obeisk, raised in commemoration of another hard-fought attle.

The eastern bank of the lake of Garda, which belongs o the province of Verona, is not so favoured by nature as he opposite or Brescia side: the ridge of Monte Baldo anges close to the shore of the lake, and joins on the north he Alps of the Tyrol. The town of Malsesine, with an ld Gothic castle, is on this coast, as well as the little town f Garda, which has given to the lake its modern name.

In the mountains near Verona is the village of Gargagago, where Dante, an exile from his country, and for a ime a guest of Can della Scala, lord of Verona, wrote part f his 'Purgatorio.' A descendant of his by the female side, he Countess Serego Alighieri, a woman of literary acquirenents, was residing at Gargagnago in 1826, when Valéry isited that place: she had collected the best editions of he poem of her great ancestor, and intended to have a monument raised to him, but she died shortly after. The village of Colognola was at one time the residence of the cholar Bonfadio, who has sung the praise of its scenery in atin verse. [Bonfadio, Jacopo.] Near Colognola is he mansion of the Counts Pompei, an old family of Verona, ne of whom, Alessandro Pompei, in the first part of the ighteenth century, was a distinguished architect. The cience of architecture seems to have perpetuated itself rom the Roman times in this part of Italy.

The valley of Ronca, fifteen miles distant from Verona, s worth the notice of the geologist for its fossil fishes and ts *shells*, some of which are not found in the Italian seas. he natural bridge of Veja is also a remarkable object.

(Valéry, *Voyages en Italie*; Denina, *Quadro Istorico tatistico dell' Alta Italia*; Serristori, *Statistica dell' talia*; Persico, *Descrizione di Verona, e delle sue Proincie.*)

VERO'NA, the chief town of the Province of the same ame, and the largest in the Venetian states next to enice, is situated in 45° 25′ N. lat. and 11° E. long., on he banks of the Adige, which divides the town into two arts, and at the foot of hills which are the lower offsets f the mountains of the Tyrol. The situation of Verona s pleasant and healthy; the town is substantially built, ith long and tolerably wide streets, is surrounded by old alls flanked with towers, and retains much of the appearnce of a town of the middle ages. The ramparts and astions constructed by the architect and engineer San Micheli in the early part of the 16th century, were estroyed according to one of the conditions of the peace f Luneville in 1801, but parts of them which remain tesfy the great solidity and strength of the original onstruction. Among the many remarkable buildings f Verona the most worthy of notice are, the splendid alace Canossa, built by San Micheli for Louis Canossa, ishop of Bayeux in Normandy and papal nuncio in rance and England; the palace called della Gran Guardia the Piazza di Bra, the elegant palace Guasta Verza by an Micheli; the palace Bevilacqua, whose once rich useum has been dispersed—the finest of its antient culptures are now at Münich. Several galleries of paintngs which existed at Verona have been likewise sold of ate years. The palace Ridolfi has a curious representaion of the cavalcade of Pope Clement VII. and Charles V. on the occasion of that emperor's coronation at ologna. A fine engraving in eight sheets has been ade of it, and published at Verona in 1830: 'La gran avalcata di Clemente VII. e Carlo V. della sala Ridolfi, ipinta da Brusasorci, incisa a contorno da Agostino ornerio.' The palace del Consiglio is built on the design f Sansovino, but its spacious hall was constructed by Frà iocondo the commentator of Vitruvius. The customouse is a noble building raised in the last century by ount Alessandro Pompei.

The churches of Verona are numerous, and many of hem interesting for their monuments and paintings. The hurch of SS. Nazario e Celso is said to be of the seventh entury; its monastery, now suppressed, had some curious aintings of that age. The subterraneous galleries in its eighbourhood were once used as catacombs. The church of S. Zenone dates from the ninth century: its bronze ates, and a statue of the saint and his tomb, and its urious emblems, arabesques and figures, attest its antiquity. The cathedral of Verona, a Gothic building, said to be of the age of Charlemagne, with its façade covered with old sculptures of men and animals, contains the tomb of Pope Lucius III., who being driven away by the people of Rome, died at Verona in 1185; several valuable paintings, among others an Assumption by Titian, a monument erected by the citizens of Verona to their townsman the learned Bianchini, a sepulchral monument of the Roman times bearing the names of Julius Apollonius and his wife Attica Valeria, and other interesting objects. The church of S. Fermo has a fine mausoleum of the Turriani, a family which produced eminent physicians and anatomists in the 15th century. This monument has been stripped of its bronze rilievi, which are now in the Louvre at Paris. In the same church are the monument of the Veronese chronicler Saraina, that of Piero and Luigi Alighieri, raised by their brother Francesco, the last male descendant of Dante in the 16th century, the monument of Francesco Calceolari, a botanist and the author of the 'Iter in Baldum,' and other monuments of learned men, and also several very old paintings, one of which, by an unknown artist, is said to be anterior to the time of Cimabue. The church of Santa Maria della Scala contains the tomb of Scipione Maffei, the author of 'Verona illustrata.' S. Giorgio Maggiore and S. Sebastiano are among the finest churches of Verona, and are rich with paintings by Brusasorci, l'Orbetto, Farinati, Dai Libri, and other artists.

The library of the Chapter of Verona is very antient: it contains 12,000 volumes and about 540 MSS., among which is a palimpsest of the Institutes of Gaius, discovered by Niebuhr. [Gaius.] It was in the same library that Petrarch discovered, to his great joy, Cicero's Epistles 'ad familiares.' Several valuable private libraries, such as those of Saibanti and Gianfilippi, have been sold of late years.

The Teatro Filarmonico of Verona is a handsome structure; in the court and under the portico is Maffei's collection of Etruscan and other inscriptions, and of antient bassi-rilievi given by him to his native town. Maffei's bust is above the door of the theatre.

The sepulchral monuments of the Della Scala family in the shape of pyramids, surmounted by the equestrian statues of the various members of that family who were lords of Verona, are a remarkable object. The most splendid of these monuments however is not that of Can Grande, the friend and patron of Dante, but of one of his successors, Can Signorio, who murdered one of his brothers.

The pretended tomb of Juliet is still visited by credulous travellers.

The amphitheatre of Verona, one of the best-preserved monuments of its kind, is noticed under Amphitheatre. Another classical monument, the Arco de' Gavii, the sepulchre of an antient family, with its handsome fluted columns, was pulled down in 1805 in order to clear the approaches to the citadel. Its columns and capitals were still lying on the ground when Valéry saw them last. Pindemonte, the poet of Verona, has deplored in his verse the destruction of that antient monument. The gate De' Borsari is said to have been built by the emperor Gallienus. There are also some pillars and other remains of an antient gate called 'Porta di Leone.' The handsome modern gate called 'Porta del Palio' is the work of San Micheli. Remains of an antient theatre have been lately discovered.

Four bridges cross the Adige at Verona: that called Di Castelvecchio is remarkable for the width of the central arch.

Verona is a bishop's see: it has a lyceum, a 'Collegio delle Fanciulle,' or house of education for young women, a school of drawing and painting, an academy of agriculture and commerce, and a clerical seminary.

The general head-quarters of the Austrian army in Italy are fixed at Verona, a situation well suited for the purpose. Verona is altogether a very interesting city, one of the first among the second class of Italian towns: the population amounts to near 60,000 inhabitants. Many families of the local nobility have their residence at Verona, and in the pleasant country-seats which are scattered among the neighbouring hills. It has produced in various ages men, and also women, distinguished for their learning. Isotta Nogarola, styled la Grande Isotta, a celebrated learned woman of the 15th century, resided at Azzano in the neighbouhood of Verona. Fracastoro, a physician, astronomer, naturalist, and poet, lived at Incaffi, near the banks of the lake of Garda. For a full notice of the learned men of Verona we must refer to the second part of the 'Verona Illustrata' of Maffei.

Verona was a town of the Cenomani, according to some, or of the Veneti according to others. Livy (v. 35) says that the Cenomani Gauls occupied the country previously held by the Libui, in which were Brixia and Verona. Maffei maintains that Verona was never a town of the Cenomani, but was part of the Venetia. A voluminous controversy on this subject is found in a thick volume, folio, printed at Brescia in 1750, entitled 'Memorie Storico-critiche intorno all' antico stato de' Cenomani.' However this may be, Verona came under subjection to Rome, like the rest of the Venetia, without much struggle. Under the empire it produced many distinguished men, such as Catullus, Pliny the elder, Vitruvius, and others. After the fall of the empire, it was one of the principal towns of the Longobards. It was afterwards taken by Charlemagne, and became subject to the new Western empire. In the 12th century it was a free municipal town, and joined the Lombard league. In the following century it fell under the power of Ezzelino da Romano, after whose death Mastino della Scala, of an old family of Verona, was elected Podestà, about A.D. 1259. His descendants usurped the sovereign power, and created the dynasty of Della Scala or Scaligeri, which lasted above a century, until it was conquered by the Visconti, dukes of Milan, who became masters of Verona. After the death of Giovanni Galeazzo Visconti, Verona was seized by treachery by Francis of Carrara, lord of Padua; but in 1409, being besieged by the Venetians, the citizens gave themselves up to Venice, by a convention which secured their municipal liberties, and since then Verona has formed part of the Venetian state.

(Saraina, Maffei, and the other historians of Verona; Valéry, *Voyages en Italie.*)

Table of Principal Buildings.

	Date.	Architect.	Remarks.
The Amphitheatre	. .	. . .	An ellipsis of 506×404 feet. [AMPHITHEATRE.]
Porta de' Borsari	265	Vitruvius Cerdo	An antient Roman arch with two openings.
San Zeno	1045—1178	. . .	An interesting specimen of Lombardic style.
The Duomo	1453—1473	. . .	Lombardic, pointed and round-headed windows. Entrance exceedingly rich. Originally begun in the eighth century. Brick and marble.
Santa Anastasia	1260	Niccolo da Pisa, &c.	
San Fermo	1313	. . .	Lombardic. Pointed windows.
Palazzo del Consiglio	15th century.	Fra Giocondo.	
Santa Maria in Organo	1542	Sanmicheli	The façade up to the architrave by him. Corinthian columns grouped with pilasters. The openings very bold and rich.
San Tommaso	16th century.	Sanmicheli	Interior by him.
Cappella Pellegrini	16th century.	Sanmicheli	In S. Bernardino. A rotunda 32 feet diameter, 64 high. Very much decorated.
Madonna di Campagna	16th century.	Sanmicheli	Singular and beautiful in plan; a rotunda surrounded by a deep colonnade. Interior octagon; dome too large.
Palazzo Bevilacqua	16th century.	Sanmicheli	Unfinished. Rusticated Doric and Corinthian, some of the columns of the latter fluted spirally. Unusually bold and rich frieze and cornice.
Palazzo Canossa	1528	Sanmicheli	Rusticated basement, with mezzanines. Corinthian order in coupled pilasters.
Palazzo Pellegrini	16th century.	Sanmicheli	
Palazzo Pompei	16th century.	Sanmicheli	Rusticated basement. Order fluted Doric with a single range of lofty arched windows.
Palazzo Verzi	16th century.	Sanmicheli	Basement, five open arches. Order fluted Doric pilasters, with arched windows and mezzanines.
Palazzo della Gran Guardia	16th century.	Sanmicheli	
Lazzaretto	16th century.	Sanmicheli	The inner area 357×728 feet, entirely surrounded with wide arches on square pillars. Circular chapel in centre.
Porta del Palio	16th century.	Sanmicheli	Rusticated. Fluted Doric, with enriched frieze. Inner front same order; rusticated columns, and five large arches.
Porta Nuova	16th century.	Sanmicheli	
Porta di S. Zenone	16th century.	Sanmicheli	The front towards the city better than the other.
Museo Lapidario	18th century.	. . .	Ionic portico.
Theatre	18th century.	Fr. Galli-Bibbiena.	
Theatre della Academia Filarmonica.	18th century.	Pompei	
Exchange	18th century.	Pompei	Octastyle Doric portico. Inner area 180 feet long.
San Paolo di Campo Marzio	18th century.	Pompei	The façade.
Seminario	18th century.	Calderari	
Casa Cocastelli	18th century.	Calderari	
Collegio de' Fanciulli	1822	Malacarne	
Cemetery in Campo Marzio	1832	Barbieri	A spacious enclosure about 600 feet square, surrounded with a Grecian Doric colonnade, and with a building in the centre of each side.

VERONE'SE, ALESSANDRO, a celebrated painter of e Venetian school, was born at Verona about 1582. is family name was Turchi or Turco ; he was called also Orbetto, according to Pozzo, from the circumstance of s having as a boy led about an old blind beggar, said to ve been his own father. Alessandro used to amuse mself with drawing with charcoal upon walls, and some his efforts having been seen by the painter Felice usasorci, he was taken by him as a colour-grinder in his udio, and was encouraged to cultivate his ability for awing. He soon made great progress in drawing and painting, surpassed his master, and, after the death of usasorci in 1605, completed some of his unfinished orks. He afterwards went to Venice, and obtained emoyment there from Carlo Saracino, who soon discovered s ability and value as an assistant ; he paid him a ducat day, whilst he paid his other assistants only a quarter of at amount. After spending some time in Venice, Alessandro returned to Verona, but not meeting with the enouragement he expected, he set out for Rome in comany with Antonio Bassetti and Pasquale Ottino, and ltimately established himself there, though he spent some me subsequently at Verona. In Rome he studied the orks of Raphael and the Carracci, and forming a style r himself which combined many of the beauties of the oman and the Venetian schools, entered successfully into ompetition with Sacchi and Pietro de Cortona in the hurch Della Concezione and elsewhere ; and he acquired e reputation of one of the best painters of his time. His principal works are in Verona, where there are two f his masterpieces, a Pietà in the church Della Misericordia, which, though it contains only a dead Christ, the irgin, and Nicodemus, is considered one of the best ctures in Verona : the other is the Passion of the Forty artyrs, in the church of San Stefano; a picture, says anzi, which in impasto and foreshortening reminds us of e Lombard school, in design and in expression of the Roman, and in colouring of the Venetian ; and it contains selection of heads worthy of Guido. There is a very ne collection of his works in the possession of the Ghirdini family, all of which were painted by Alessandro r the Marquis Gasparo Girardini, who was a most generus patron to him, and, according to some existing docuents, supported him when he first went to Rome. lessandro married a Roman lady, and lived in great state Rome, but died poor in 1648, without issue, according Pozzo. Passeri says he died in 1650; and Passeri's ccount differs in some other respects from that of Pozzo : e says he was the scholar of Carlo, the son of Paolo eronese, and that he left two sons and a daughter by his ife : the elder son followed the profession of the law ; he second, Giacinto, was a painter, but he died in the ower of life, in 1673. Lanzi states that Passeri says that lessandro was called L'Orbetto from a defect in the eye : ut Passeri does not assert this, he simply mentions the ct of a defect in the eye, and says that he was called Orbetto because when a boy he used to lead his father bout, who, he had heard, was blind. The works of this ainter are admirably coloured ; they appear not to have uffered any change of tint whatever from their original tate, owing probably to the great care with which he is nown to have mixed his colours and selected and preared his oils.

(Dal Pozzo, *Vite de' Pittori, &c. Veronesi* ; Passeri, *Vite e' Pittori*, &c. ; Lanzi, *Storia Pittorica*, &c.)

VERONESE, PAUL. [CAGLIARI, PAOLO.]

VERO'NICA, a genus of plants belonging to the natural rder Scrophulariaceæ. The species consist of herbs, underhrubs, or shrubs, with opposite, alternate, or verticillate eaves. The flowers are of a blue, white, or red colour, and re arranged in spikes or racemes. The calyx is campanuate or compressed, 4- or 5-parted. The corolla rotate, with a very short tube, a 4-parted spreading limb ; all the segments entire, the upper one the broadest. The stamens are 2, situated at the sides of the upper segment of the corolla, diverging ; anthers 2-celled. Stigmas hardly thickened. The fruit a capsule, with a septum in the middle or bipartible. The species of this genus are exceedingly numerous : Don enumerates upwards of 170. They are distributed over all parts of the world, and are especially abundant in temperate climates. The Flora of Great Britain contains about 20 species.

V. spicata, Spiked Speedwell, has its flowers on a spiked raceme, the leaves crenated, the radicle ones ovate or obovate, and running into the petioles ; the cauline leaves are lanceolate or oblongo-lanceolate, sessile, toothed, and entire at top ; the whole plant downy, canescent, and rather clammy. It is a native of Germany, France, and Switzerland, and is found in England, in some parts of the county of Suffolk.

V. officinalis, Common Speedwell, has spicate flowers, with leaves broadly ovate, serrated, and rough with pubescence ; stem very downy, procumbent ; the capsule obovate, deeply notched ; the bracts longer than the pedicels of the flowers. It is a native of Europe and North America, in woods and on dry sandy banks, and is plentiful in Great Britain. It has pale blue-coloured corollas with veins of a deeper blue. Paullix, an old Danish botanist, endeavoured to prove that this plant was identical with the tea-plant of China, and it was once extensively used as a substitute for tea. It has an astringent bitter flavour, and is not so agreeable to the taste as tea. If however the consumption of tea depends on its containing chemical principles which it has in common with other plants, the analysis of the constituents of common European plants is perhaps an object worth the attention of the chemist. The abundance in which this plant occurs renders varieties not uncommon, and several have been recorded. It was at one time considered a remedy of some importance in various diseases, and administered as a tonic and diuretic, properties which it undoubtedly possesses.

V. Beccabunga, Brooklime, is a glabrous shining plant, with procumbent stems, and elliptic oval or oblong leaves, seated on short petioles, serrated or entire. It is a native of every country in Europe, and is also found in North America and Nepaul, and is abundant in Great Britain. It grows in ditches, rivulets of clear water, and in running streams. It has racemes of deep-blue flowers marked with veins of red. It was at one time reckoned, in common with several species of Cruciferous plants, as an antiscorbutic, and found a place in some of the Pharmacopœias. It possesses no active properties, is almost destitute of smell, and has a saline slightly bitter taste.

V. Montana, Mountain Speedwell, has lax few-flowered racemes with ovato-cordate, serrated, petiolate leaves ; a stem hairy all round ; and an orbicular 2-lobed membranous capsule much larger than the calyx. It is a native of Europe, but is not very common in Great Britain. It is generally found in woods and groves on a calcareous soil, but not always in mountainous districts, as its name would infer.

V. Chamædrys, Germander Speedwell, has the whole plant hairy, the leaves deeply and unequally serrated, the racemes elongated and many-flowered, the capsule obcordate and shorter than the calyx. On dry banks, in groves, meadows, pastures, and hedges throughout Europe, this plant is very common, and is a general favourite on account of its being among the very first that opens its flowers in the early spring. It is sometimes known by the name of Bird's-eye, and is often mistaken for the Forget-me-not.

V. Teucrium, Germander-leaved Speedwell, is a downy plant, with the lower leaves ovate-oblong, half-clasping the stem, obtuse, and coarsely serrated, the upper ones sessile, narrower, and serrated ; the racemes axillary, opposite, on long peduncles, and the stems ascending or prostrate. It is a native of Italy, Switzerland, and Germany in clayey soils. This plant is called in the older Pharmacopœias the Mountain Speedwell, and at one time entered into the composition of several esteemed diet-drinks. It has much the same properties as the common speedwell.

V. longifolia, Long-leaved Speedwell, has opposite leaves, 3 or 4 in a whorl, cordato-lanceolate, acuminate, doubly serrated, clothed, as well as the stem, with a downy tomentum. It is a native of the Continent of Europe and Siberia. It is very changeable in its characters, and a great number of varieties have been recorded.

V. decussata, Cross-leaved Speedwell, is a glabrous plant with permanent, elliptic, decussate leaves, few-flowered racemes, and a shrubby stem. This is a shrub attaining a height of 1 or 2 feet. It is a native of the Falkland Islands and the Straits of Magalhaens, and with care may be cultivated in the open air in this climate.

A number of foreign species of Veronica are commonly cultivated in British gardens. The hardy perennial, herbaceous species are all fitted for growth in flower-borders: they require little culture, and are easily propagated by dividing their roots. The annual species, though some of them are very beautiful, are seldom grown in gardens: they may be propagated by seeds. Several of the species from New Holland and New Zealand require to be cultivated in the greenhouse.

VERRI, PIETRO, born at Milan, of a noble family, in 1728, studied at Rome and at Parma, after which he obtained a commission in an Italian regiment in the Austrian army, and served in Saxony in the war between Austria and Prussia. After the peace he returned to his native country, and was made a member of the Council of Economy instituted by Maria Theresa for the duchy of Milan, in 1765. He took an active part in the administrative and financial reforms which were effected about that time, and especially in abolishing the practice of farming to private individuals or companies the various branches of the revenue of the state, a system which was injurious both to the people and to the treasury; and also in drawing the plan of a new tariff or scale of duties, which proved a great relief to industry and commerce. His principal written works are noticed under POLITICAL ECONOMY. He besides wrote 'Storia di Milano,' down to the conquest of Charles V. in the 16th century, the publication of which was completed after the author's death. He also published 'Osservazioni sulla Tortura, e singolarmente sugli effetti che produsse all' occasione delle unzioni malefiche alle quali si attribuì la pestilenza che devastò Milano l'anno 1630,' an historical episode which has been since treated by Manzoni in his 'Promessi Sposi.' Verri has contributed greatly to illustrate the history of his native country, Milan. He continued in office in the economical administration of the duchy of Milan till 1786, when he retired to private life. He was made a knight of St. Stephen, and was a leading member of the 'Patriotic Society,' instituted at Milan in 1777, by Maria Theresa, for the encouragement of agriculture, arts, and manufactures. When the French invaded Lombardy in 1796, Verri was appointed member of the municipal council of Milan, but he died of apoplexy in June of the following year. His biography has been written by Isidoro Bianchi, Professor Ressi, Pietro Custodi, and lastly by Camillo Ugoni. He was one of the most distinguished and estimable Italians of the generation that preceded the French revolutionary invasion.

VERRI, ALESSANDRO, younger brother of Pietro, is chiefly known for a work, partly imaginative and partly historical, entitled 'Le Notti Romane al Sepolcro dei Scipioni.' The author evokes the souls of the leading political men of various ages of antient Rome to appear before him in the newly-discovered vaults of the tombs of the Scipios, and makes them hold dialogues about the deeds of their earthly career. He tears down the veil of blind admiration, so long held sacred by Italian tradition and Italian vanity, and reveals the vices, the crimes, and the mistaken patriotism of antient Rome. The style and language of the work are powerful and impressive. Alessandro Verri died in 1816. Both Pietro and Alessandro were the chief contributors to a literary journal of considerable merit, entitled 'Il Caffè,' published at Milan.

VE'RRIO, ANTO'NIO. This Neapolitan painter was born at Lecce about 1639, and after he had made some progress in painting, for which he had displayed a great ability at a very early age, he visited Venice to study the colouring of the Venetian school. After making a stay sufficient for his purposes in Venice, he returned to his native place, and the success which attended the execution of some gay works there induced him to try his fortune at Naples, where, in 1660, he painted a large composition in fresco of Christ healing the Sick, in the college of the Jesuits, which was conspicuous for its bright colouring and forcible light and shade. Dominici says that Verrio had such a love for travelling that he could not remain in his own country. He went to France and painted the high altar of the Carmelites at Toulouse. Shortly after this, Charles II. wishing to revive the manufacture of tapestry at Mortlake, which had been interrupted by the Civil War, invited Verrio to England; but when he arrived, Charles changed his mind, and intrusted to him the decoration in fresco of Windsor Castle. Verrio executed a series of extensive frescoes in that palace, with as much facility of execution as insipidity of invention. He painted most of the ceilings, one side of St. George's Hall, and the chapel; but few of his works are now left. The following instances may serve as illustrations of the taste, character, and judgment of Verrio:—On the ceiling of St. George's Hall he painted, Antony, earl of Shaftesbury, in the character of Faction dispersing libels; in another place he borrowed 'the ugly face' of Mrs. Marriot, the housekeeper, for one of the furies, in revenge for a private quarrel he had had with her; and in a composition of Christ healing the Sick he introduced himself, Sir Godfrey Kneller, and Mr. May, surveyor of the works, in long periwigs, as spectators. The painter of these works was recorded in the following inscription, written over the tribune at the end of the hall: 'Antonius Verrio Neapolitanus non ignobili stirpe natus, ad honorem Dei, Augustissimi Regis Caroli Secundi, et Sancti Georgii, molem hanc felicissima manu decoravit.'

Verrio was paid enormously for these and many other works he painted in England. Vertue found a paper containing an account of moneys received by Verrio for works executed in Windsor Castle from 1676 to 1681, not including those in St. George's Hall, amounting to 5545l. 8s. 4d. The king also gave him the place of master-gardener and a lodging in St. James's Park. Verrio was of very expensive habits, and kept a great table, and 'often,' says Walpole, 'pressed the king for money with a freedom which his majesty's own frankness indulged. Once at Hampton Court, when he had but lately received an advance of a thousand pounds, he found the king in such a circle that he could not approach. He called out, "Sir, I desire the favour of speaking to your majesty." "Well, Verrio," said the king, "what is your request?" "Money, Sir: I am so short in cash, that I am not able to pay my workmen, and your majesty and I have learned by experience that pedlars and painters cannot give credit long." The king smiled, and said he had but lately ordered him 1000l. "Yes, Sir," replied he, "but that was soon paid away, and I have no gold left." "At that rate," said the king, "you would spend more than I do to maintain my family." "True," answered Verrio, "but does your majesty keep an open table, as I do?"'

After the accession of James II. Verrio was again employed at Windsor in 'Wolsey's Tomb-house,' then destined for a Roman Catholic chapel. He also painted James and several of his courtiers in the hospital of Christchurch, London: he painted likewise at Bartholomew's hospital.

After the Revolution he gave up his place of master-gardener, and refused to paint for William III. He executed however at this time the extensive works for Lord Exeter at Burleigh-house, which are considered Verrio's best productions, and they are among the best specimens of the prevailing style of that age. For these paintings alone, says Dr. Waagen, Verrio was paid more money than Raphael or Michael Angelo received for all their immortal works. He was occupied over them about twelve years, with a salary of 1500l. a year, besides his keep, and an equipage at his disposal. He painted also at Chatsworth and at Lowther-hall. Walpole says that the altar-piece of the Incredulity of St. Thomas, in the chapel at Chatsworth,' is the best piece he ever saw by Verrio. He was eventually persuaded by Lord Exeter to serve William III., and he was sent to Hampton Court, where, besides other things, he painted the great staircase so badly, that he appears to have done it so designedly. Towards the end of his life he began to lose his sight, and Queen Anne granted him a pension of 200l. a year, but he did not enjoy it long: he died at Hampton Court in 1707. The statement of Dominici that he was drowned in Languedoc is evidently an error.

Walpole has described Verrio's style with great piquancy, but probably with as much truth; he says he was 'an excellent painter for the sort of subjects on which he was employed, that is, without much invention, and with less taste; his exuberant pencil was ready at pouring out gods, goddesses, kings, emperors, and triumphs, over those public surfaces on which the eye never rests long enough to criticize, and where one should be sorry to place the works of a better master—I mean ceilings and staircases. The New Testament or the Roman History cost him nothing but ultramarine; that, and marble columns, and marble steps, he never spared.'

Scheffers of Utrecht worked twenty-five years for Verrio, and he employed a painter of the name of Lanscroon seven or eight years at Windsor.

(Dominici, *Vite de' Pittori, &c. Napolitani*; Walpole, *necdotes of Painting in England*; Waagen, *Kunstwerke nd Künstler in England*, &c.)

VE'RRIUS FLACCUS, a Roman grammarian of the me of Augustus. He was a freedman, but distinguished mself so much by his learning and his method of teach- g, that Augustus appointed him instructor to his two andsons Caius and Lucius, the sons of Agrippa, and ansferred him with his whole school to the Palatium, on ondition however that he should not admit any additional apils to the number he had already. He had an annual lary of one hundred sestertia. He died in the reign of iberius, at an advanced age. At Præneste a statue was ected to him in the lower part of the forum, opposite e Hemicyclium, which contained on large marble plates e Fasti, which Verrius Flaccus had drawn up for the rænestines. (Sueton., *De Illustr. Grammat.*, 17.) These asti are the so-called Fasti Prænestini, of which con- derable fragments were discovered in 1770, and published y P. F. Foggini, under the title, 'Fastorum anni Romani Verrio Flacco ordinatorum reliquiae, ex marmorearum abularum Fragmentis Praeneste nuper effossis collectæ t illustratæ,' &c., Rome. 1779, fol. They are also printed F. A. Wolf's edition of Suetonius, vol. iv., p. 321, &c., d in Orelli's 'Collection of Roman Inscriptions' (c. xxii., l. ii., p. 379, &c.). Before the discovery of these Fasti, ich are of the highest value, some scholars believed that e Fasti Capitolini, which were discovered in 1547, were e Fasti of Verrius Flaccus, referred to by Suetonius: but is opinion is now shown to be untenable. Flaccus was o the author of several other antiquarian and gram- atical works, which were highly valued for the vast antity of information they contained, as well as for the rity of their style: 1, 'Libri Rerum Memoria Dignarum,' which among other things he treated on Etruscan an- uities. It is frequently referred to by Pliny (Gellius, .5); 2, 'De Verborum Significatione,' consisting of at st twenty-four books. It gave explanations of words alphabetical order; and besides its philological value, seems to have been an inexhaustible treasure of anti- aran knowledge. An abridgment of this work was de by the grammarian S. Pomponius Festus, and this again abridged in the time of Charlemagne, in such a ner that the original character of the work was alto- ther destroyed. These wretched abridgments have, as many other instances, caused the loss of the original k. (K. O. Müller, *Praefatio ad Festum*, p. 12, &c.) 'Saturnus' (Macrob., *Sat.*, i. 4 and 8) was, according to ller's conjecture, only a part of a greater work, 'De bus Sacris;' 4, 'De Orthographia,' which was attacked Scribonius Aphrodisius (Sueton., *De Illustr. Gram- t.*, 18); 5, 'De Obscuris Catonis,' a linguistic work, in ich he explained the antique words and phrases of to, which had become unintelligible (Gellius, xvii. 6); 'Epistolæ;' and, 7, Poems. We still possess numerous gments of the works of Verrius Flaccus, independent of 'Fasti Prænestini' and the abridgment of his 'De rborum Significatione.' They are collected in the work Foggini above referred to; in Dacier's edition of Festus , pp. 14-27, ed. London, 1826); in E. Egger's 'Scrip- um Latinorum nova Collectio,' vol. ii.; and in Linde- ann's edition of Festus, pp. 293-299.

VERRO'CCHIO, ANDRE'A DEL, a celebrated Italian inter, sculptor, goldsmith, and architect of the fifteenth ntury, was born at Florence in 1432. Vasari says he had tle genius, but was the most laborious man of his time: e was, according to Baldinucci, a scholar of Donatello. e first distinguished himself as a goldsmith, both at lorence and at Rome; he then devoted himself solely to ulpture in bronze and in marble. His first marble work as a monument in the Minerva at Rome, to the wife of ancesco Tornabuoni; it is now in the Florentine gal- ry. The expression of the figures is good, but the exe- ition is very imperfect. His next work was a colossal onze figure of David, now also in the Florentine gallery. e executed several other works in metal, by which he quired a great reputation: the principal of them were e monument in San Lorenzo, of Giovanni and Pietro, the ns of Cosmo de' Medici, and the Incredulity of St. homas, in the church of Or San Michele, at Florence, nished in 1483; it is a colossal group of two figures, eighing 3981 pounds, and for which, according to Baldi- acci, he was paid 476 gold florins (Manni, in a note to Baldinucci, says 800 heavy florins). In this work, says Vasari, Verrocchio left nothing to be wished for; and having attained perfection in sculpture, he began to turn his attention to painting. Some modern critics have differed from Vasari with regard to its great excellence. Von Rumohr speaks of the Winged Boy with a Dolphin, of the fountain of the first court of the Palazzo Vecchio, also by Verrocchio, as a very superior work: it is praised likewise by Vasari.

Vasari mentions many designs and cartoons by Verrocchio, some of which were copied and imitated by Lionardo da Vinci. Nothing is known of these designs at present; it has been conjectured that many of them now pass as the works of Lionardo. Verrocchio painted very few pictures; he gave up painting upon finding himself surpassed by his scholar Lionardo da Vinci, whom he had ordered to paint the figure of an angel in one of his works. [VINCI, LIONARDO DA.] The fame of Verrocchio reached Venice, and he was called to that place to cast an equestrian statue of Bartolomeo Colleoni, the celebrated general; but when he had just finished the model of the horse, he was told that Vellano of Padua was to make the figure of the general, with which he was so much offended that he immediately broke the head and feet of his horse, and left Venice without giving the slightest intimation of his determination to his employers. This so exasperated the signory of Venice in their turn, that they wrote to Verrocchio, and told him that he had better not return to Venice if he valued his head; to which Verrocchio answered, that he would be mindful of their admonition, for they were as little capable of restoring him his head as they were of finding another head sufficiently beautiful for his horse. This answer pleased them greatly; and they now earnestly solicited Verrocchio to return, promising him twice the remuneration formerly agreed to. Verrocchio returned and cast his model, but he caught cold in the casting, and died a few days afterwards, before the statue was quite completed. This work was finished by Alessandro Leopardi, who cast the pedestal, and fixed it in its place in the Piazza di Santi Giovanni e Paolo, in the year 1495, and it stands there still. Cicognara, who has given an outline of this monument in his 'Storia della Scultura,' supposes that Leopardi recast the statue itself, but he gives a very insufficient reason for this opinion. Verrocchio's remains were taken by his favourite scholar Lorenzo di Credi to Florence, and were deposited in the vault of Michele di Cione, in the church of Sant' Ambrogio. Over the vault is the following inscription:—'S. Michaelis de Cionis et Suorum et Andrae Verrocchi, filii Dominici Michaelis, qui obiit Venetiis M.CCCC.LXXXVIII.' The S signifies Sepulchrum.

Verrocchio had many scholars, of whom the following were the most distinguished:—Lionardo da Vinci and Pietro Perugino, painters, and Lorenzo di Credi, Nanni Grosso, and Francesco di Simone, sculptors.

Bottari says that Verrocchio was one of the first who made plaster casts from living and dead subjects, but not the first, as Vasari states. This art was practised likewise by the antient artists of Greece: it was invented by Lysistratus, the brother of Lysippus, in the time of Alexander the Great. (Pliny, *Hist. Nat.*, xxxv. 12, 44.) Verrocchio also assisted Orsino in his wax figures; they made together three figures of Lorenzo de' Medici, after the conspiracy of the Pazzi in 1478, which, says Vasari, appeared to be living men: they were differently dressed; one, which was placed in the church of the Monache di Chiarito, was clothed in the dress which Lorenzo wore when he was wounded by the conspirators. These figures are all now lost.

Verrocchio cast the first copper ball which supported the cross at the cathedral of Florence; it was thrown down by lightning, and the present ball, which is somewhat larger than Verrocchio's, was put up in its place. That of Verrocchio was four ells in diameter, and weighed 4368 pounds. This celebrated artist, with his other accomplishments, combined a good knowledge of geometry and great practical skill in music.

(Vasari, *Vite de' Pittori*, &c.; the same work translated into German by Schorn; Baldinucci, *Notizie dei Professori del Disegno*, &c.)

VERRU'CA, Schumacher's name for a genus of *Cirripeds*, identical with *Clitia*, Leach. [CIRRIPEDA, vol. vii., p. 209.]

VERRUCA'RIA, a genus of plants belonging to the natural order of lichens, and to the tribe pseudo-lichens of the arrangement of Acharius. The name of this genus is derived from *verruca*, 'a wart,' on account of the appearance of its surface; it is known by the plant being crustaceous, cartilaginous, flatly expanded, adnate, uniform; the apothecia or receptacles wart-like, hemispherical, roundish at the base, growing into the thallus, with a double covering (perithecium); the exterior somewhat cartilaginous and thick, having above a little pimple or perforation; the interior very fine or membranous. The species of this genus are found on rocks and flints, and the bark of trees, and are abundant inhabitants of Great Britain. They are too numerous to afford any indications of the character of the barks to which they are attached, for which several of their allies are very remarkable.

VERSAILLES, a town in France, capital of the department of Seine et Oise, 8 miles in a direct line west-south-west of Paris, or 11 miles by the road through Sèvres: in 48° 48′ N. lat. and 2° 7′ E. long.

Versailles was a mere village in the time of Louis XIII., who, as well as his father, Henri IV., used to hunt in the neighbouring woods. Louis XIII. having purchased (A.D. 1627) the house and lands of Jean de Soisy, lord of the village, built here a small hunting-seat, which Louis XIV. converted, by his vast and expensive additions (A.D. 1661-1672), into the most magnificent palace in Europe. Under this prince (from the year 1672) and his successors Louis XV. and XVI. it was, except during the seven years of the minority of Louis XV., the ordinary residence of the court; and the village of Versailles grew into a handsome city of 70,000 (some accounts say 100,000) inhabitants. At present its population is less than half that number: it was, in 1826, 29,986 for the commune; in 1831, 28,477; and in 1836, 29,209.

The town is divided into two nearly equal parts by a noble avenue, 'the avenue of Paris,' nearly half a mile long, running east and west, planted with four rows of elms, forming three alleys, the centre alley 160 feet wide, and the two side alleys 64 feet each, making the total breadth of this noble avenue at least 288 feet: the middle part of the centre alley is paved. The road from Paris, of which this avenue forms part, enters the town on the east, making a bend at the entrance of the town, so as to bring the traveller immediately opposite to the palace, which faces the avenue at its western extremity; but the noble view of the palace which would be obtained is intercepted by a rising ground, over which the avenue runs, and which scarcely allows the top of the building to be seen. Before the bend at the entrance of the avenue of Paris, the road passes between the villages of Grand Montrueil on the right and Petit Montreuil on the left: these villages are now regarded as suburbs of Versailles. Versailles itself is divided by the avenue into 'the quarter of St. Louis,' or 'Old Versailles,' on the left or south side, and 'the quarter of Nôtre Dame,' or 'New Versailles,' on the right. The quarters are named after the parish churches which they respectively contain: the names of Old and New Versailles are inappropriate, as the two parts are equally modern, and consist of straight streets crossing each other at right angles.

Beside the avenue of Paris, two other avenues, that of St. Cloud on the right, and that of Sceaux on the left, converge to the Place d'Armes, or parade, which is at the western end of the Avenue de Paris, immediately in front of the court of the palace. These avenues, though not so wide as that of Paris, are planted with fine elms, and lined with pleasant residences: that of St. Cloud leads by St. Cloud to Paris; that of Sceaux leads only to a round pond or basin faced with freestone, and constructed, as a pompous Latin inscription declares, 'by the Ædiles of the city of Versailles.' Besides these avenues, which may be compared with the boulevards of Paris, there are in New Versailles three boulevards, called Boulevard du Roi, Boulevard de la Reine, and Boulevard St. Antoine, all planted with fine elms, and the first and second bordered with neat houses and other buildings. There are several 'places,' or open spaces: the Place d'Armes is the largest; the Place Hoche (adorned with a statue of the general from whom it is named), formerly the Place Dauphin, in New Versailles, is the handsomest. There are two market-places, one in Old and one in New Versailles. There are a number of fountains.

The centre of the town front of the palace is formed by the building of Louis XIII. This has a centre and two wings advancing at right angles from the centre, so as to enclose three sides of a court, which is open on its fourth or east side toward the Place d'Armes. This part of the building is of brick, and of ordinary appearance: two buildings of freestone which terminate the wings, and are adorned with Corinthian columns, are modern additions. Two [illegible] buildings of plain and heavy architecture, more like barracks than parts of a palace, appear to form prolongations of the wings, from which however they are really detached, and inclose the outer court, termed 'La Cour des Ministres;' the inner court, between the wings, is called 'La Cour Royale;' and its innermost part, immediately in front of the central pavilion, is termed, from the material of its pavement, 'Cour de Marbre,' or the 'Marble Court.' The central and principal part of the palace of Louis XIV. forms three sides of a quadrangle, sufficiently large to envelop in its enclosure the older palace of Louis XIII. so that the two palaces stand back to back, that of Louis XIII. fronting the town, and that of Louis XIV. fronting the garden. The central part of the latter, which incloses the older palace, presents three fronts to the garden, namely, the principal front and two side-fronts, and is in advance of the rest of the building; the wings, which have the same general direction as the principal front of the central building (viz. north and south), are thrown back about 250 or 260 feet, which is the extent of the two side-fronts of the central portion. The whole extent of the garden front is estimated at more than [illegible] feet; but as this measurement includes the side-fronts of the central building, the space occupied by the garden front is reduced to less than 1400 feet. This front, notwithstanding some serious faults, is in the estimation of many persons, one of the grandest and most beautiful in existence. It is adorned with Ionic columns, [illegible] in number, arranged in fifteen colonnades of four, [illegible] or eight columns, each colonnade supporting a cornice crowned with as many statues as there are columns; and if the northern face or extremity of the north wing, and the southern face of the south wing, be included, the number of columns will be augmented to one hundred and two. The spaces between the colonnades are adorned with pilasters, or with columns engaged in the wall, and the attic has dwarf pilasters throughout, corresponding to the columns and pilasters of the principal story; it is surmounted by a balustrade, formerly crowned with sculptured trophies and vases. Niches immediately behind some of the intercolumns are occupied by statues, which, as well as those which crown the cornice of the colonnades, agreeably to the taste of the period, represent heathen deities or nymphs, or are allegorical representations of the arts or the virtues. A great number [illegible] mutilated. This palace was built from the designs of J. H. Mansard.

Immediately in front of the palace, on the west side, [illegible] the garden or little park, an irregular polygon about [illegible] miles long from the palace to its western extremity, and about two miles broad. It is included in the limits of the great park, which is estimated to be from 20 to 25 miles in circuit. The garden was laid out by Le Notre, agreeably to the fashion of the time, in formal terraces, parterres, and alleys, adorned with a profusion of statues, vases, and other sculptures; with a canal in the shape of a cross, and other pieces of water of the same formal character, and a number of fountains, which are supplied with water from the Seine by the forcing-pump (substituted for the former water-works), the aqueduct, and reservoirs of Marly. The fountains play on the first Sunday in the month during the summer, but not to their full extent; these exhibitions are termed 'Les petites eaux:' the more complete exhibitions of 'Les grandes eaux' are reserved for certain holidays, of which notice is given in the public prints, and attract a multitude of spectators from Paris. The orangery is remarkable for the number and beauty of the orange-trees which it contains.

The interior of the palace was fitted up with great [illegible] by Louis XIV.: the most eminent painters were engaged to decorate the ceilings of the apartments; and gilding and sculpture were profusely employed. But after the overthrow of royalty in the first Revolution, the palace was neglected; and as neither Napoleon nor the Bourbons did anything effectual for its restoration, it came into a very dilapidated condition. The care of Louis-Philippe has

ted a considerable improvement, and the palace is
converted into a national museum or gallery of
in gs and other monuments illustrative of different
s of the history of France. In the central build-
the ground-floor is occupied by the portraits of the
admirals and constables of France, of the marshals
n to Grouchy, and of a number of generals of eminence,
lebver, Foy, Carnôt, &c., who did not attain that rank;
the first floor by paintings and other memorials of the
of Louis XIV. The south wing is occupied by
itings illustrative of the first Revolution; by a series of
itings of the great victories of France, from that of
iac, under Clovis, to Wagram, the last decisive vic-
of Napoleon: by others illustrating the series of
oleon's campaigns; and by busts and statues of the
rnon and other celebrated men of the revolutionary
od. The palace, thus furnished, was opened June
, 1837, on the marriage of the late duke of Orleans.

djacent to the north wing of the palace, on the back
own side, are the chapel and the opera-house; the first
arkable for its beauty, and the second for its size and
gnificence. It was also used as a ball-room, on which
asions the pit was covered by a floor on a level with
stage. This opera-house, after having been long
ed, was employed for dramatic entertainments at the
ting of the national museum. The chapel was built
Louis XIV. (A.D. 1699-1710); the opera-house by
s XV. (A.D. 1755-1770).

ne cost of the palace, grounds, and waters of Versailles
enormous; and Louis XIV. is said to have thrown the
ments into the fire to prevent the amount being
vn. The estimates which some writers have made,
which raise the cost to 1000,000,000 livres, or
00,000*l*., or even more, are obvious exaggerations;
rs, which reduce it to 307,000,000 livres, or 12,000,000*l*.,
lso disputed. We have no trustworthy estimate; but
the expense was enormous there is no doubt, especially
e include the cost of all the connected works, as the
of Le Grand Trianon, and the vain attempts to
ey the waters of the Eure to Versailles. In this sad
mpt, in which 40,000 soldiers in a time of peace were
loyed, a great number of lives were lost.

the park of Versailles are the two royal palaces of
Grand Trianon' and 'Le Petit Trianon,' with their
tive gardens. Le Grand Trianon was built by Louis
.; Le Petit Trianon by Louis XV. The 'English
en,' which is the great attraction of Le Petit Trianon,
formed by the orders of Marie Antoinette, to whom
husband, Louis XVI., had granted the use of this
e. In the Place d'Armes, opposite to the town-front
e palace, are the two ranges of stables, Les Grandes
es and Les Petites Ecuries, buildings of great extent,
pying respectively the spaces between the avenue of
and the converging avenues of St. Cloud and Sceaux.
e are near the palace various other buildings, as the
d Commun, a heavy building, which had a thousand
ing-rooms, and could lodge two thousand persons.
ng the republic and the empire it was converted into a
afactory of fire-arms, and was pillaged by the Prussians
815. To the south-east and south of the palace are
kitchen-garden and a very large piece of water called
Pièce des Suisses.' The former mansions of the Grand
ître de la Maison du Roi, or grand-master of the king's
sehold, and of the grand-veneur, or chief huntsman,
ularly termed Le Chenil, or the dog-kennel, are now
verted respectively into the town-hall and the courts
aw: the former Garde-Meuble is now the prefect's
e. Besides these and other buildings connected with
court or the government offices, Versailles has two
rches, namely, the cathedral of St. Louis and the church
Nôtre Dame; the latter erected by J. H. Mansard in
reign of Louis XIV., the former by another Mansard
he reign of Louis XV. There is also a beautiful chapel
ched to the royal college (formerly an Augustinian
nery, founded by the queen of Louis XV.), and there
parish church in the village or suburb of Montreuil.
e general hospital is one of the finest in France; and
re are a Petit Séminaire, or a seminary for boys designed
the priesthood; the primary normal school of the
adémie Universitaire of Paris; a public library of
00 volumes, placed in what was antiently the foreign-
ce; a museum; a free-school for drawing; an agricul-
al society; a theatre; baths; several barracks; and a
prison. Near the town is the royal experimental farm of Grignon.

Versailles has some manufactures of fire-arms, files, clocks and watches, jewellery, cotton-yarn, net, pasteboard, hats, hosiery, wax candles, earthenware, and glass. There are breweries and tan-yards, and a number of nursery-grounds; and trade is carried on in grain, groceries, and fruit-trees. There are two weekly markets, of little importance, and three yearly fairs. A number of the old nobility and others of good families, French and foreign, reside at Versailles. A small garrison is kept there.

Several of the royal family of France were born at Versailles: among them, Philippe V., king of Spain; Louis XVI., XVII., and XVIII., and Charles X., kings of France: Marshal Berthier, the benevolent Abbé de l'Epée, and General Hoche, were also natives of Versailles or of Montreuil.

The treaty of peace which closed the American war was signed at Versailles (A.D. 1783), and some events of the earlier period of the Revolution occurred there. It was at Versailles that the states-general assembled (May, A.D. 1789), and the deputies of the Tiers-état, or Commons, constituted themselves the National Assembly. The disturbances and outrages of the following October led to the removal both of the king and of the National Assembly to Paris. In Sept., 1792, fifty-five prisoners on their way from Orléans to Paris were nearly all massacred at Versailles, as well as a number of persons confined in the prisons. In 1815 a small Prussian detachment, having been repulsed in a skirmish near Versailles, Blücher, at the head of a considerable force, entered the place, and disarmed and plundered the inhabitants.

Versailles is the seat of a bishopric, the diocese of which comprehends the department: the bishop is a suffragan of the archbishop of Paris.

The arrondissement of Versailles has an area of 328 square miles, and comprehends 114 communes: it is subdivided into ten cantons or districts, each under a justice of the peace: the population was, in 1831, 130,741; in 1836, 133,551.

(Vaysse de Villiers, *Itinéraire Descriptif de la France;* Dulaure, *Environs de Paris;* Malte-Brun, *Géographie Universelle; Dictionnaire Géographique Universel.*)

VERSED SINE. [TRIGONOMETRY.]

VERSION. The word Version, or Translation, is used to express the transferring of some written composition from one language into another. Like many other terms, translation cannot be briefly defined: the notion of translation must be attained by a consideration of all the conditions of translation; and the right understanding of its nature involves a part of the general theory of language.

If two languages corresponded perfectly; if every term in the one language had its equivalent in the other; and if the forms of speech in the two languages were also perfect equivalents, the difficulty of translation would not be great. It would only be necessary to discover the equivalent terms and the equivalent forms of speech in the two languages, and translation would be effected by mere substitution. In this supposed case, as the terms and the forms of expression would be perfectly equivalent, a person who should read the translation would understand it exactly as a person would understand the original; for the supposition of the two languages being perfect equivalents involves the supposition of the objects of thought and the mode in which their relations to one another are viewed being the same for the people who use the two languages. Now no two languages have this perfect equivalence of terms and forms of speech, and therefore a perfect translation cannot be made.

The general distribution of words into notional and relational words is explained in the article NOTION. In no two languages are all the notional words perfectly equivalent. Such words as express many of the ordinary objects of sense, as sun, moon, man, woman, are perfect equivalents; but all the words which express objects of sense in one language have not their equivalents in another. Various nations have various articles of dress, various utensils, implements, and ornaments which are peculiar to them, and consequently have not their equivalents in another language. If such terms are rendered by some other term in the language into which the translation is made, the translation will not convey the exact notion of the original, though it may come near enough for many purposes. In some cases the difference is immaterial, as may be shown by instances; in others the difference is material. The Latin words 'domus' and 'navis' may be respectively rendered by the English 'house' and 'ship,' though Roman houses and ships differ considerably from English houses and ships. But if the word 'domus' is merely used to signify the general notion of a dwelling for man, as for example when one wishes to say that a 'man was killed in a house and not in the street,' the precise difference between Roman houses and English is immaterial, for house in such case is used in its most general sense. But if in the original Latin passage anything turned on the difference between 'domus' and 'villa' as opposed to one another, then, unless the English language possessed two words which should stand in the same opposition to one another as 'domus' and 'villa,' a translation could not be made simply by equivalent terms: it must be effected in some other way. Material objects then, for which there may be equivalents in two languages when the object is used in its most general sense, may not have equivalents in the two languages when used in this special sense. Thus the Latin words 'patera,' 'urna,' 'lanx,' are words which express the general notion of a thing that is used to contain other things; but as they are also used to indicate a particular kind of containing vessel, there can be no translation of such terms unless we have both the things and the name for them. It appears then that, even in the case of such ordinary things as domestic utensils, a translator will often be at a loss to find a word equivalent to the original word; and he must either find a word which comes the nearest to it, or he must adopt the original word. In the one case he will not convey an exact notion to the reader, and he may convey a very erroneous notion; in the other he will convey none at all, unless the reader happens to know the thing intended by the term in the original language. The context may often help to the right understanding of a term, but that is not the matter at present under consideration.

The terms which denote the political and religious institutions or usages of a country often present still greater difficulty. The Roman terms 'Aedilis,' 'Consul,' 'Comitia,' 'Tribus,' 'Judex,' 'Pontifex,' 'Augur,' cannot be rendered into our language by any equivalent terms. In these and many similar instances it has become usual to adopt the original term, with the termination sometimes slightly altered, and the reader of such translations is supposed either to know what these terms mean or to have books which will explain them. This is in fact the only practicable mode of translating such terms, and such translation is not liable to more objection than a book in one's own language which contains numerous technical terms, the explanation of which is not given in the book, and cannot be got from the context, but must be sought for in a dictionary or work of reference.

If the original language has been more cultivated than the language into which the translation is made, the translator will find that he is ill provided with terms equivalent to those of the original. Foreign works on jurisprudence or philosophy, when translated into English, present this difficulty, which can only be overcome by adopting the technical terms of the original language. If the translator were to attempt to make names which should correspond to the original terms, he would not be so likely to succeed in getting them adopted as by transferring the original terms into his translation.

That part of translation then which consists simply in finding equivalent notional terms is limited. It depends on the character of the two languages, the original and that of the translation, how far equivalent terms can be found. In all matters which characterize the usages of a people, it is impossible to find equivalents in two languages, for by the term character is here meant something which each has and the other has not. As to all terms which are the expression of universal notions, such as are in a great degree independent of the character of a people, those languages which have been cultivated to an equal degree, do possess terms which are sufficiently equivalent. But even here there is often a very great difficulty in ascertaining the equivalent terms, as any one may satisfy himself by attempting to translate into English such a work as Cicero's treatise on the Orator, or some parts of Tacitus.

Perhaps it is often easier to translate from one language into another when the two languages have no [illegible] connection, than when they are related as original [illegible] derived languages, or as languages which have [illegible] changed terms, or where the exchange has been all [illegible] side; for it often happens that words which are [illegible] from one language into another retain nearly the [illegible] form, and yet have either been adopted in a different [illegible] from the original sense, or have in course of time [illegible] such different meaning. It would be easy to find [illegible] examples of such change of meaning in words [illegible] been introduced into the English either directly [illegible] Latin or through the medium of other languages.

The union of notional words into connected [illegible] language is effected by the words of relation, [illegible] either appendages added to words, or separate small [illegible] or both; and it is also effected by the order of the [illegible] Now the words of relation and the order of [illegible] considerably in most languages, and hence arises a [illegible] difficulty in translation; for language consists not of [illegible] words, no more than a ship consists of trees: in the [illegible] of language and a ship, words and timber are [illegible] but materials without form have no significance. [illegible] everything the nature of the material is an [illegible] capacity for receiving form; and in language the [illegible] sion or absence of case-endings, and of [illegible] show the modifications of words, called [illegible] materially influences the capacity of the language [illegible] pressing a given idea with perspicuity, brevity, [illegible] it also materially affects the possible order [illegible] Those languages which possess case-endings [illegible] terminations in abundance can vary the order of [illegible] in a great number of ways, so as to place [illegible] in those positions where they shall be most [illegible] language like the English, which, in its present [illegible] few suffixes, is much more limited in this power [illegible] German, the Greek, and the Latin. Languages [illegible] greatly in the number of small words (relational [illegible] which are adapted to express the relation of [illegible] to one another. Some of the more delicate [illegible] are thus expressed in one language are absolutely [illegible] of being expressed in another by any [illegible] relational words, and sometimes they cannot [illegible] by any combination of words.

It will now not be difficult to ascertain in a [illegible] what can be effected in a translation, and what ought [illegible] attempted. Some people have had a notion that a [illegible] tion should be literal, or near to the original, by [illegible] meant that every word of the original should [illegible] equivalent in the translation, or nearly so. There [illegible] objection to this, so far as it can be done [illegible] the proper idioms of the translator's language; [illegible] translation is not commendable because it is [illegible] because it is true. The idiom of the translation [illegible] be corrupted by an imitation of the idiom of [illegible] If what is called a literal version is a sufficient [illegible] the meaning, and if it is also expressed in a [illegible] the translation is good; but its literal character [illegible] accident. It will depend both on the character [illegible] languages and on the character of the original [illegible] far the version shall in its form correspond to the [illegible] Simple narrative is generally easily rendered [illegible] language into another without varying much [illegible] form of the original. Works which have more [illegible] artistic character present greater difficulties, whether [illegible] are historical, critical, or poetical. Poetry presents [illegible] greatest difficulties, because, in addition to the [illegible] difficulty of transferring the meaning of one language [illegible] another, there is the difficulty of reproducing the [illegible] mical form of the original, and this is sometimes [illegible] sible. Horace succeeded in introducing the Greek [illegible] metres into the Latin language in his translations or [illegible] tations; but Horace was a master of his art, and he [illegible] language which was sufficiently near to his original. [illegible] translations of Voss from the Greek and Latin poets [illegible] the advantage of being in a language which, from [illegible] copiousness, its grammatical forms, and its capacity [illegible] combining words, renders such an undertaking practicable [illegible] in skilful hands. The English language has copiousness [illegible] and energy, but less flexibility than the German, and the [illegible] imitation of the rhythmical forms of other languages [illegible] sometimes impossible in an English version; and without [illegible] this imitation the translation of poetry is incomplete, for [illegible] the metrical form is a part of poetry. It is indeed often [illegible] y to express in a prose translation the ideas of poetry as ose of prose composition, for the essential qualities of oetry are not destroyed by reducing it from its metrical into prosaic form. In this form it may still fill the mind with e images of the original, but it will not equally affect e passions; for the passions are most vehemently moved y direct sensuous impressions, and the sensuous character f poetry is its metrical form. All attempts therefore at oetical translation from one language into another can nly be partially successful, unless the character of the wo languages admits of a perfect metrical imitation in he translation.

A translator should show his judgment by the choice of is subject as well as by his manner of handling it. He ill not choose what is incapable of being rendered adequately. He will not attempt to fashion his form of xpression to that of the original by doing violence to his wn idiom. He will neither servilely follow the division f sentences nor the forms of expression. He will labour o penetrate through the author's language to his meaning, nd he will then strive to express that meaning in his own anguage. He must rigidly scrutinize the result of his abour, to see if it conveys the same meaning as the original, and neither more nor less. When this is accomplished, his translation will be sufficient, though it may t be perfect. It will be all that a translation often can —a sufficient copy of the original.

But there may be something wanting. Every writer has eculiarities which constitute his style. One writer is ntentious, compressed, and energetic, but perhaps obscure; another is diffuse, flowing, and redundant, but fills e ear more than the mind; a third may be perspicuous d *simple*, but withal feeble. Now a translator who ould so far mistake his original as to give a diffuse rsion of a sententious writer, or to express any original a form which should be altogether unlike it, would ow that he had ill appreciated the writer's character, and would not be the only blunder that we might expect m him. A version of a prose writer which should s a general character altogether unlike the original uld as little merit the name of a translation as a dull version of the Iliad would deserve the name. To true medium between a close imitation of the style the original and a wide departure from it, belongs to department of the business of translation in which is concerned. It is something wherein precise rules never be laid down, and yet the best critics will not agree in their judgment. It is a gross error which we in some attempts to translate Tacitus, to reproduce the ginal with all its obscurity and brevity: it is a grosser nder to weaken his sententious energy by a profusion of ds, many of which, being impertinent and idle, only a stronger contrast with those of the original, which been selected and arranged with studious care.

Like portrait-painting, translation has only one rule, and not a rule which shows us how to act, but only prescribes a certain end. Make your copy like the original; no man mistake it. Many copies may be made, and may be pronounced to be likenesses. Compare the likenesses with one another, and you will find one which all be more like than the rest. Ask the master how he ade it: he will say that he copied the original; but how e did it you cannot understand, nor can he say.

VERSTEGAN, RICHARD, was the grandson of Theodore Rowland Verstegan, the descendant of a family of tient respectability in Guelderland, who came over to is country a young man towards the end of the reign of enry VII., and, dying soon after he had married an glishwoman, left a child not more than nine months ld, whom his mother, when he grew up, bound apprentice a cooper. Verstegan the cooper, who, when he became his own master, carried on his trade in the parish f St. Catherine, London, appears to have been in good rcumstances: Richard was his son, and after having een instructed in the classics at school, was sent by him the University of Oxford, where he soon came to distinguish himself, especially by his proficiency in Saxon iterature and the knowledge of the national antiquities, tudies then much in vogue. He left the University however without taking a degree, objecting, it seems, to the aths; and soon after, openly declaring himself a Roman Catholic, he left England and took up his residence at Antwerp. Here he published his first work, a thin quarto, now of great rarity, entitled 'Theatrum Crudelitatum Hæreticorum nostri Temporis.' It is a violent attack upon Queen Elizabeth and her government, especially in reference to the executions of Jesuits and other Popish recusants; but it is chiefly curious for a number of copperplate engravings it contains, representing the hanging, beheading, and quartering of these martyrs, as they are styled, after drawings made by the author. This appears to have been before 1585, although the only edition of the book that is now known is dated 1592; for in 1585 Verstegan is stated to have gone to Paris, and to have been there thrown into prison by order of the king, Henry III., on the English ambassador's representation of the abusive nature of the work. However, he was not long detained in custody; and upon his release he returned to Antwerp, where he set up as a printer, and is said to have prospered in that business, and soon acquired the means of living in good style. In 1605 appeared at Antwerp the first edition, in small quarto, of his best-known work entitled, 'A Restitution of Decayed Intelligence concerning the most noble and renowned English Nation.' This performance, which is adorned, like his other book, with engravings from drawings by the author, and which was reprinted at London in 4to. in 1634, and in 8vo. in 1653 and 1674, contains a few curious facts and remarks; but it had been nearly superseded before it came from the press by Camden's 'Britannia,' the first edition of which appeared the preceding year. It is now considered as of hardly any authority. Verstegan is also supposed to be the author of 'Odes in imitation of the Seven Penitential Psalms,' professing to be by R. V., and some other tracts in English with the same initials, printed abroad in the first years of the seventeenth century, of which a list is given in Wood's 'Athenæ Oxonienses.' He married some years before his death, which is believed to have taken place about 1635. Sir Egerton Brydges has given a short account of the rare volume of 'Odes,' attributed to Verstegan in his 'Censura Literaria,' ii. 95-97 (1st edition.)

VE'RTEBRA. [Skeleton.]

VERTEBRALI'NA. [Foraminifera, vol. x., p. 348.]

VERTEBRA'TA, the principal grand division of the animal kingdom, consisting of the Vertebrate Animals or those which have a true backbone. This division includes Man and the animals which most resemble him.

In the *Vertebrata* the brain and principal trunk or chord of the nervous system is enclosed in a bony or gristly case composed of the skull and the vertebræ. To the sides of this central column are attached (when present*) the ribs and bones of the limbs. [Skeleton.] This bony framework forms the support of the muscles, by which the machinery is put in action; and the viscera are enclosed in the head, the chest, and the trunk.

The animals of this division have all red blood; a muscular heart; a mouth with two jaws, one placed above or in front of the other; and generally distinct organs of the senses of sight,† smell,‡ hearing, and taste, placed in the cavities of the face. They have never more than four limbs; the sexes are always separate; and there is always a very similar distribution of the medullary masses and the principal branches of the nervous system.

Cuvier, from whom, chiefly, this definition is taken, remarks, that in examining more closely each of the parts of this grand series of animals, one always finds some analogy, even in the species most distant from each other, and may follow out the degradations of the same plan, from Man to the lowest of the Fishes.

The following are the classes of the *Vertebrata*:—Mammalia; *Aves* [Birds]; *Reptilia* [Reptiles]; *Pisces* [Fish].

VERTEX, a name given to any remarkable or principal point, particularly when that point is considered as the top or summit of a figure. Thus we have the three vertices of a triangle, the vertex of a cone or pyramid, &c.

VERTICAL. The zenith being considered as a vertex, which in fact it is, when the word vertex means summit, a vertical plane is one which passes through the line drawn from the spectator to his zenith; a vertical plane therefore merely means one which is perpendicular to the horizon, and a vertical line has the same meaning.

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* The Lamprey, for instance, is an exception.

† Spalax is an exception.

‡ The Cetacea are exceptions.

VERTICILLUS, in Botany, a term applied to the arrangement of flowers and leaves around the axis. Whenever leaves are seated on the same plane on the axis of the plant, and on different sides of the axis, they are said to be opposite; but if several leaves are seated on the same plane in a stellate manner, they form a verticillus. Whenever there are more than two leaves and two flowers arranged on the same plane, they are called verticillate. In many Lamiaceous plants the flowers are arranged on the same plane on opposite sides of the axis, several flowers existing opposite each other on the same side: this is sometimes called a spurious whorl, *verticillus spurius*. In many plants the flowers are only developed on one side of the stem, as in *Teucrium Chamædrys*, *Hyssopus officinalis*, and some species of *Rumex;* and in these cases the flowers are said to form a half-whorl, *verticillus dimidiatus*. According to the theory of the normal spiral arrangement of the parts of plants, the regular verticillus results from the suppression of internodes on all sides of the axis; the spurious verticillus, from the suppression of internodes on two sides only; whilst the dimidiate is the result of suppression on one side only.

VERTI'GO, or Giddiness, is a peculiar sensation depending probably on some disturbance of the circulation in the brain. It need not be described, for whoever has not felt it may do so at once by turning round a few times rapidly. The nature of the change produced in the brain by the numerous causes of giddiness is altogether unknown; probably the sensation may be the result of several different conditions, for it ensues alike when the pressure of the blood upon the brain is diminished by bleeding, and when it is increased in plethora, or what is called determination of blood to the head: it is a sign too as well of deficiency of food as of repletion; and of the various continued movements by which the steady flow of blood through the brain may be disturbed, though the rotatory motion is the most general cause of giddiness, yet the movement of the head backwards and forwards or from side to side will produce it as effectually, and the vertical movement, such as is endured in the pitching of a ship, more certainly still. At present therefore it must be concluded that whatever disturbs the movement or the pressure of the blood within the brain may produce giddiness; and that in some cases it occurs without any cause of this kind, as a sympathetic or purely subjective sensation, dependent on the state of the substance of the brain itself.

As a sign of disease vertigo by itself indicates very little. No judgment can be formed from it except by taking it in connection with the other characters of the affection of which it is a part, and these will generally be sufficiently indicative. Its most common cause is some disturbance of the digestive organs, and it may be safely treated in that view, except in those who are prone to apoplexy or other cerebral disease, in whom it must be always regarded with fear.

VERTI'GO, Müller's name for a genus of the *Colimacea* of Lamarck.

Generic Character.—Shell cylindrically fusiform, sinistral, hyaline; the aperture margined, sinuous, and denticulate on the inner edge; the peristome somewhat reflected.

This terrestrial genus is minute, and bears some resemblance to *Pupa;* but the shells are sinistral, or left-handed, to use the collector's term, and of a glassy transparency. [HELICIDÆ.]

Vertigo pusilla. (Great Britain.)

VERTOT, RENE' AUBERT DE, was the second son of a poor Norman gentleman, who claimed kindred with every family of distinction in his province. René was born on the 25th of November, 1655. He studied in the Jesuits' College at Rouen. He was characterised from childhood by an earnest spirit of piety. Towards the close of the second year of his collegiate studies he disappeared, and although an active search was immediately instituted, it was not till after the lapse of six months that he was discovered in the Capuchin convent at Argentan. All efforts to divert him from his intention of joining that order were fruitless: he took the vows, and adopted the conventual name of Brother Zachary. The rigour of the order undermined a constitution naturally delicate; he was obliged to visit his family for the restoration of his health. The opinions of medical men and of the doctors of the Sorbonne persuaded him, with some difficulty, to join a less ascetic order; and the pope's dispensation having been obtained, he entered in his twenty-second year the Premonstrant Abbey at Valsery.

The abbé Colbert was at this time general of the Premonstratensian order. Hearing a favourable account of the talents and acquirements of young Vertot, he appointed him his secretary. Soon after he presented him with the priory of Joyeueral. By the canon law, any regular priest who had obtained a licence to quit one order and join another was declared incapable of holding any charge or dignity in his new fraternity. The order opposed the promotion of Vertot on this ground. The appointment was confirmed by a papal bull: still the monks were refractory. A royal injunction was obtained to corroborate the decree of the pope, but at this stage of the business Vertot withdrew his claim. Probably he anticipated little comfort in an abbey where the inmates had so stoutly opposed his admission. He applied for the cure of Croissy-la-Carenne, near Marly, the presentation to which belonged to the order; and retiring to it, devoted himself to the discharge of his spiritual duties and literary pursuits.

Hitherto Vertot's name had been unknown beyond the circle of his private friends and his ecclesiastical brethren. At the instigation, it is said, of Fontenelle, St. Pierre, and other friends, he undertook historical compositions. His first publication was his 'Histoire de la Conjuration de Portugal,' which was published in 1689. The recent revolution in England rendered the title attractive; the work became fashionable—and judges, such as Madame de Sevigné and Père Bouhours, expressed highly favourable opinions of the work. Vertot might have become a [illegible] in the circles of Paris; but although in the immediate vicinity of the city, he stood aloof. His chief desire was to return to his native province. With this view he asked and obtained a cure in the Pays de Caux. Not long after he was transferred to a richer living near Rouen, which, not being dependent on his order, in a great measure released him from their control.

Increase of wealth seemed but to increase his industry. Seven years after the publication of his first work he gave to the world his 'Histoire des Révolutions de Suède.' This work has more of personal adventure and interest than the former, and its success was proportionably greater. Five editions followed each other in rapid succession. The work was translated into several languages. The Swedish envoy at the court of France was instructed to engage Vertot to compose a general history of Sweden; an overture which led to nothing.

In 1701 the king re-organised the Academy of Inscriptions and Belles-Lettres. Vertot was nominated Académicien Associé. The appointment was embarrassing. He could not afford to relinquish his cure and reside in Paris, and by the new regulations the Academicians were required to be resident. The strict rule was relaxed in his favour, and he did not take his seat in the Academy till 1703, when he had been long enough a resident clergyman to entitle him to a retiring pension. His arrival in Paris was the close of a retired life, which however had been marked by stormy passages. The wits among his acquaintances said, 'Here end the revolutions of the Abbé de Vertot.'

In 1705 he was appointed Académicien Pensionnaire. From this date his contributions to the Annals and Memoirs of the Academy are frequent. They turn chiefly upon historical topics. A discussion in which he was engaged in the Academy led to his next publication. The assertion of the antient independence of their province by the Bretons appeared to Vertot, as salaried Academician, in the light of a rebellion against the royal authority. He undertook to disprove their claims. The arguments swelled to such a bulk, that in 1710 he published them in a separate volume, entitled 'Traité de la Mouvance de Bretagne.' The continuance of the controversy ultimately extended this essay into his 'Histoire complète de l'Etablissement des Bretons dans les Gaules.'

These occupations did not divert Vertot from his favourite topic—the revolutions of the Roman republic.

his work is no result of a philosophical and critical examination of the Roman authorities. Its merit is simply torical—the elegant and agreeable narrative of statements ken for granted at the hands of the classical authors. was Vertot's favourite work: he was accustomed to ad fragments of it as he advanced, at the meetings of the ademy, and was known to burst into tears at his own athos. This history, which appeared in 1719, was still ore favourably received than its predecessors.

The reputation of Vertot induced the Order of Malta to vite him to become its historian. He complied with the quest, and published, in 1726, his 'Histoire des Chevaers Hospitaliers de St. Jean de Jerusalem, appelés depuis s Chevaliers de Rhodes, et aujourd'hui les Chevaliers de alte.' Vertot was advanced in years when he undertook is work, and he did not sympathise with the heroes and xploits of the middle ages as with those of the classic ges of Rome. The 'History of Malta' is inferior in point f finish and picturesque energy to his earlier writings, but nfinitely more valuable on account of its originality. His ccess to authentic information rendered it valuable, and night have done so to a greater extent had he possessed ore the spirit of an historian and less that of a mere rrator.

Besides the works already mentioned and his contribuons to the memoirs of the Academy, two works by Vertot ave been published: the first, an account of the negotiations of the brothers De Noailles, in 1755-57, in England, ompiled from documents placed in his hand by the family. he author of the notice of Vertot in the 'Biographie niverselle' speaks of this work as unpublished: this is a range oversight in an otherwise able article; the book as deposited in the archives of the Noailles family, and ublished, after the author's death, in four volumes, 12mo., Leyden, in 1763. Two tracts, one on the 'Origin of the pal Sovereignty,' the other on the 'Election of Bishops d Abbots,' were published twenty years after his death. heir authenticity has never been questioned. They pear to have been compiled at the request of a minister, the occasion of some quarrel with the court of Rome.

Vertot died in the Palais Royal on the 15th of June, 35. His works are more valued for their style—for a rtain power of dramatic portraiture—than for any other commendation, with the exception of the 'History of alta' and the 'Account of the Negotiations of the two e Noailles,' which contain materials for history not to be und elsewhere. The excessive enthusiasm of his youth pears to have sobered down into a tempered habitual ety. He was a zealous royalist. The controversy reecting the ancient history of Bretagne was carried on by m less as an antiquarian than a political discussion. He nt so far in his zeal as to denounce Freret to the vernment for some opinions expressed in that author's Origine des Français.' In his private conduct Vertot was eproachable: the only trace of passion in his life was e ardent platonic attachment he conceived for Madeoiselle de Launay (better known as Madame de Stael) in s sixtieth year. There was a vein of effeminacy both in e intellect and character of Vertot; yet it is impossible ot to respect him.

VERTUE, GEORGE: this celebrated English engraver nd antiquary was born in London in 1684, of parents ore honest than opulent; yet 'if vanity had entered into s composition,' says Walpole, 'he might have boasted e antiquity of his race. Two of his name were emoyed by Henry VIII. in the Board of Works: but I fort—a family is not ancient if none of the blood were ove the rank of ingenious men two hundred years ago.' t about the age of thirteen Vertue was placed with a enchman, who was the principal engraver of arms in ondon at that time; but, being of extravagant habits, he roke,' and returned to his own country three or four ars after Vertue was bound to him. Vertue, in his emoir, has concealed his name; Walpole questions hether Scaliger would have been so tender. After this e spent two years at home, which he devoted to the udy of drawing: he then engaged himself for three ars with the engraver Michael Vandergucht, which rm he protracted to seven; and in 1709 he set up r himself. He was introduced to Sir Godfrey Kneller, n acquaintance which proved of great service to him ortly afterwards, upon the death of his father, when e support of his mother and brothers and sisters devolved entirely upon him. The patronage of Sir Godfrey procured him much employment, and in a very short time his own merit procured him much more. Lord Somers commissioned him to engrave a portrait of archbishop Tillotson, and this print, for which he was richly rewarded, was the foundation of his future fortune. Walpole says nothing like this print had appeared for some years, and Vertue stood without a competitor in any country. Edelinck of France, White of England, and Van Gunst of Holland, were dead.

In his leisure hours Vertue practised drawing and music, and studied French and Italian, and later he acquired also Dutch. In 1711 an Academy of Painting was instituted in London, of which Sir Godfrey Kneller was placed at the head, and Vertue was one of its first members: he drew a little in water-colours, and painted a few portraits, but his productions in this style consisted chiefly of copies of old or interesting works which he intended to engrave.

During the reign of Anne, Vertue was chiefly employed over portraits after Kneller, Dahl, Richardson, Jervase, Gibson, and others; and at the accession of George I. he engraved a large head of the king after Kneller, of which several thousands were sold, and which brought him a great increase of business, though by no means a very excellent performance. He commenced early in this reign to make his researches for his 'History of the Arts in England.' In this undertaking he found two valuable patrons in Robert Harley, second earl of Oxford, and Heneage Finch, earl of Winchelsea: the latter, who was president of the Society of Antiquaries in 1717, appointed Vertue, who was a member, to be its engraver; and he executed nearly all the prints which were published by that society during the remainder of his life. Lord Coleraine was also one of his patrons; and Vertue made many journeys in various parts of England, in furtherance of his researches, in company with these noblemen, by whom his expenses were paid. Many other noblemen also encouraged him in a less degree. In 1728 he was invited by the duke of Dorset to Knowle, where he copied several portraits of the poets, of which he published a set of twelve in 1730, namely, Gower, Chaucer, Spenser, Shakspere, Ben Jonson, Beaumont, Fletcher, Milton, Butler, Cowley, Waller, and Dryden. It is one of his best works, and was the first collection of illustrious heads published in England. His next work of this class was ten plates of the heads of Charles I. and the loyal sufferers in his cause, with their characters subjoined from Clarendon. These were followed by his portraits of the kings of England, &c., for the translation of Rapin's 'History of England,' published in numbers, in folio, of which, says Vertue, thousands were sold every week (probably without the prints). Over these works he was occupied three years. In 1734 he renewed his journeys about England: he made a tour with Roger Gale the antiquary; one in 1737 with Lord Oxford; another with the same nobleman in 1738; and in 1739 one in the east of England with Lord Coleraine.

In 1737 he was employed by the Knaptons, the publishers of the translation of Rapin, to engrave some of their series of illustrious heads, the greater part of which were engraved by Houbraken. The portraits of Houbraken are very superior to those by Vertue; yet, says Walpole, his by no means deserved to be condemned, as they were, and himself set aside. Vertue's fault was his scrupulous veracity, which could not digest imaginary portraits, as are some of those engraved by Houbraken, who, living in Holland, engraved whatever was sent to him. The heads of Carr, earl of Somerset, and secretary Thurloe, by Houbraken, are not only not genuine, but do not in the least resemble the persons they are meant to represent, says Walpole. 'Vertue was incommode; he loved truth.'

In 1740 he published proposals for the commencement of a series of historic prints, of which he published only two numbers, containing each four prints with explanations. In the first number there is a print of Queen Elizabeth's procession to Hunsdon House; the original picture, of which Vertue made an exact copy, in water-colours, for Lord Oxford, was, in Walpole's time, at Sherborne Castle, Dorsetshire. In 1741 he lost his patron the earl of Oxford, which so depressed him, that 'for two years,' says Walpole, 'there is an hiatus in his story.' In 1743 however he was a little revived by the notice of the duke of Norfolk, for whom he engraved the large plate of the earl of Arundel and his family, and performed other services. But in 1749 he found a more valuable patron in the then prince of Wales, whose taste coincided with his own, and whose patronage was all he could desire; 'He saw his fate,' says Walpole, 'linked with the revival of the arts he loved; he was useful to a prince who trod in the steps of the accomplished Charles—but a silent and unexpected foe drew a veil over this scene of comfort.' The prince died in March, 1751: Vertue, after speaking of his character and accomplishments, alludes to his death in the following words—' But alas, Mors ultima linea rerum! O God, thy will be done! Unhappy day, Wednesday, March 20th, 1751!'

'Vertue lost his friends,' says the same writer, 'but his piety, mildness, and ingenuity never forsook him.' He worked almost to the last, anxious to leave a competent support to his wife, with whom he had lived many years in happiness. He died July 24th, 1756, and was survived by his wife nearly twenty years: he was buried in the cloisters of Westminster Abbey. His collection of books, prints, and drawings as sold by auction in 1757: Walpole purchased several of his drawings.

Vertue was a strict Roman Catholic; yet he has preserved more monuments of the reign of Queen Elizabeth than of any other, but that of Charles I. was his favourite period. Walpole describes him as 'simple, modest, and scrupulous—so scrupulous that it gave a peculiar slowness to his delivery; he never uttered his opinion hastily, nor hastily assented to that of others. Ambitious to distinguish himself, he took but one method, application. Acquainted with all the arts practised by his profession to usher their productions to the public, he made use of none.'

Walpole's well-known work, entitled 'Anecdotes of Painting in England,' was written entirely from manuscripts which he bought of Vertue's widow, although he recurred to the original sources when Vertue drew his information from books. Vertue commenced his compilations in 1713, and they amounted in the whole to nearly forty volumes large and small. He visited and made catalogues of every collection, attended sales, copied all papers he found relative to the arts, searched registers, examined all English authors, and translated many of other countries which related to his subject. And Walpole observes in his preface:—' One satisfaction the reader will have, in the integrity of Mr. Vertue; it exceeded his industry, which is saying much. No man living, so bigoted to a vocation, was ever so incapable of falsehood. He did not deal even in hypothesis, scarce in conjecture.'

The prints of Vertue are very numerous: Walpole has given a complete list of them in his 'Catalogue of Engravers.' He has divided them into eighteen classes, as follows: royal portraits; noblemen; ladies; bishops and archbishops, of whom he engraved thirty-eight; clergymen; chancellors, judges, and lawyers; ministers and gentlemen; physicians, &c.; founders, benefactors, &c.; antiquaries, authors, and mathematicians; poets and musicians; foreigners; historic prints, and prints with two or more portraits; tombs; plans, views, churches, buildings, &c.; coins, medals, busts, seals, charters, gems, and shells; frontispieces, head- and tail-pieces; and, lastly, miscellaneous pieces; besides many plates for the Society of Antiquaries, and a series of Oxford almanacs.

(Walpole, *A Catalogue of Engravers who have been born or resided in England*, &c., constituting a fifth volume to the *Anecdotes of Painting*, &c.)

VERUS, LU'CIUS, a Roman emperor who reigned as the colleague of Marcus Aurelius, from A.D. 161 to 169. He was born at Rome, and was a son of Aelius Verus, who had been adopted by the emperor Hadrian and raised to the rank of Cæsar. After the death of Aelius Verus, in A.D. 138, Hadrian adopted T. Aurelius (Antoninus Pius), on condition that he should adopt Marcus Verus (Marcus Aurelius), the son of Annia Faustina, and Lucius Verus, the son of Aelius Verus. After the death of Antoninus Pius, in A.D. 161, Marcus Aurelius, who succeeded him, and was of a weakly constitution, voluntarily shared his imperial dignity with his adoptive brother L. Verus, who was then about 32 years old, and whose complete name is Lucius Ceianus Aelius Commodus Verus Antoninus. Up to this time L. Verus had lived as a prince in a private station, with the title of 'Augusti filius' and without either the honours or burdens of government. He had been educated by the most distinguished grammarians and philosophers of the time, but he had no taste for intellectual occupations. So long as he remained at Rome and was under the direct influence of M. Aurelius, his vicious character did not fully disclose itself. Soon after his accession the Parthians had cut to pieces a Roman legion stationed in Cappadocia, with its leader Servilianus. L. Verus took the field against them, in A.D. 162, but instead of conducting the war in person, he left it to his generals, who gained brilliant victories, while the emperor revelled in the luxuries and debaucheries with which he became familiar in the towns of Asia, especially at Antioch. In A.D. 164 he went to Ephesus, where he celebrated his marriage with Lucilla, the daughter of his adoptive father, or, according to others, of his adoptive brother. After the close of the war he returned to Rome, accompanied by hosts of actors, freedmen, and other low persons who ministered to his vulgar pleasures, and in A.D. 166 he and Marcus Aurelius solemnized a triumph over the Parthians. Soon after this Rome was visited by a fearful pestilence, and at the same time the Marcomanni and Quadi invaded the empire from the north. Both the emperors at the head of their armies marched to Aquileia. Verus again took scarcely any part in the war, but again gave himself up to his pleasures. At last when hostilities had ceased, the two emperors returned to Rome. On his way thither L. Verus was seized by a fit of apoplexy at Altinum in the neighbourhood of Venice, where he died A.D. 169, in the forty-second year of his age.

A long catalogue of his vices is given by Julius Capitolinus in his 'Life of Verus.' Indeed Verus was one of the most contemptible persons that have disgraced royal power. The only thing that can be said in his praise is that he did not oppose his adoptive brother in his administration, and that he did not, like most effeminate and licentious rulers, aggravate his vices by acts of cruelty. The good understanding between him and the noble Marcus Aurelius is almost unaccountable; but it appears to have been considerably diminished after the Parthian war. There is a marble bust of Lucius Verus in the Townley Gallery of the British Museum. [Aurelius, Marcus.]

VERVAIN. [Verbena.]

VERVIERS, a very thriving manufacturing town in the province of Liege, in the kingdom of Belgium, is in 50° 38′ N. lat. and 5° 55′ E. long., on the small river Vesdre or Wetze. It is well-built and pleasantly situated, partly in a deep valley, partly on the declivity of a mountain. It is surrounded by mountains on every side. There are 12,000 inhabitants, or, if we include the population of Hodimont, Francomont, and Ensival, which are almost blended with the town, not less than 20,000. The town is indebted for its prosperity to the very important manufacture of fine woollen cloth and kerseymere, which is said to employ 40,000 workmen in the town and neighbourhood. They are exported to the north of Europe, Germany, Italy, and Turkey. Formerly large quantities were consumed in Holland. The Belgian army is clothed in the manufactures of Verviers. The water of the Vesdre, on the banks of which the manufactories are situated, is said to possess properties which render it peculiarly fit for dyeing. There are also manufactories of wool-cards, oil of vitriol, aquafortis, and soap. There is an exchange, a chamber of commerce, and a tribunal of commerce.

(Brockhaus, *Conversations Lexicon*; Murray's *Handbook of Northern Germany*; Hassel's *Handbuch*; Stein, *Lexicon*; Cannabich, *Lehrbuch*).

VESA'LIUS, AN'DREAS, the greatest anatomist of the sixteenth century, was born at Brussels in 1514. His father, Andreas Vesalius the elder, was apothecary to the emperor Maximilian; and his uncle Everardus was a physician, and the author of some commentaries on the works of Rhazes. He received from an early age his classical and philosophical education at Louvain, and gained a degree of knowledge in physics which was unusual even with the best educated of the time. From Louvain he proceeded, to study medicine, to Montpellier, and thence to Paris, where he had for instructors Guntherus ab Andernach, Sylvius, and Fernelius. In 1526, distinguished already by extraordinary zeal in the pursuit of anatomy, and exposing himself even to great personal danger in the ob-rning of bodies for dissection, Guntherus made him his ief assistant; and in the same year he discovered the rigins of the spermatic blood-vessels. After a long residence in Paris, he returned to Louvain, where he was soon ppointed to teach anatomy: but in 1535, in order that he ight obtain better opportunities for learning it himself, e joined the army of the emperor of Germany, who was en at war with France. In 1538 he was at Bologna, nd in 1539 at Pavia, where in the following year he was ppointed professor of anatomy, having not long before blished his celebrated 'Epistola docens venam axillarem xtri cubiti in dolore laterali secandam,' Basle, 1539, 4to., which he gave an improved though imperfect anatomy the vena azygos, and maintained that blood should always be drawn from the right arm, because of the near onnection between its vessels and that vein. Vesalius mained professor at Pavia for nearly four years; in 1543 e held the same office at Bologna; and not long afterards he was appointed professor of anatomy, with an annual stipend of 800 crowns, at Pisa. His knowledge at is time is said to have been so unusual, that the best atomists of the day left his demonstrations silenced. e had in 1539 published some anatomical plates; and for e four succeeding years he gave a great portion of his me to the preparation of a complete work of the same nd, employing as his assistants some of the most skilful tists of the day. Moehsen says that Titian was among ose whom he employed, but this is not certain; for the me of that great artist is not mentioned in Vesalius's orks, and yet is not likely to have been willingly suppressed. In 1542 a part of the work was published, with e title 'Suorum librorum de Corporis Humani fabrica pitome,' Basle, folio; and in 1543 the whole appeared. was called 'De Corporis Humani Fabrica Libri Septem,' sle, 1543, folio. Another and somewhat enlarged edition was published by Vesalius at Basle, 1555, folio; and, ter his death, numerous editions appeared at various nes and places. Haller calls it 'an immortal work, by hich all that had been written before were almost superseded.' Senac speaks of it as the discovery of a new orld; and probably nothing has been written, either before or since, which has had so great an influence on the ogress of anatomy. The boldness with which Vesalius tacked the accepted and long-reverenced opinions and atements of Galen and the other antient writers; the mpleteness of the evidence with which he supported his n descriptions and arguments; the number of discoveries of structures which he announced, and the more curate accounts which he gave of nearly all that had before been known; the extent of the work, and the number d unusual excellence of the plates, were enough to ark the commencement of a new æra in the science of edicine.

But instead of the honour which Vesalius has received, d while anatomy is studied will never fail to receive om his successors, his contemporaries, or at least the ost distinguished of them, heaped on him the most virulent reproaches; for the authority of Galen in the schools as at that time supreme, and to question it was to destroy e credit of all the learning to which the teachers pretended. Sylvius said that Vesalius ought henceforth to be called 'Vesanus,' and declared perpetual hostility against him. Piccolomini more craftily maintained that all the ruth Vesalius had written was taken from the Galen and Hippocrates whom he calumniated; and Driander, Putæus, Eustachius, and Fallopius, though with less virulence, each n his way assailed him. Their attacks appear to have greatly irritated Vesalius, who seems to have been disposed to resist the authority of the antients, not less by his temper than by his conviction that they had often been in error. In 1546 he wrote 'De radicis Chinæ usu Epistola,' Basle, 1546, folio, a work in which he attacked Galen with much more virulence than before, but which he rendered of great interest by proving, by numerous examples, that Galen's descriptions must have been drawn from the dissections of monkeys and other animals, and very often from the works of his predecessors without any dissections at all.

In spite of the opposition of his contemporaries, the fame of Vesalius, both for skill in practice and for learning in the science of medicine, greatly increased after the publication of these works; and anatomy soon suffered much more from the honour than from the abuse which was lavished upon him. About 1544 the emperor Charles V. appointed him his chief physician; and he was gradually obliged to be so constant in his attendance on the court of that prince, and afterwards of Philip II. of Spain, that anatomy was entirely neglected, except in the occasional opportunities which were afforded by the examination of the bodies of those who died of strange diseases. In 1561, when he wrote his 'Anatomicarum Gabrielis Fallopii Observationum Examen,' which was published at Venice in 1564, he was at Madrid, where, he says, he could not even procure a skull to examine in order to settle some point on which he was in doubt; and both this work and the 'Examen Apologiæ Fr. Putæi pro Galeno,' which was published, under a feigned name, at the same time and place, prove, Haller says, that since he left Pisa, in 1544, he had added scarcely anything to his anatomical knowledge. His knowledge of practical medicine and surgery however appears to have greatly increased; and many wonderful stories are recorded of the skill with which he treated those about the court.

In 1563, or the beginning of 1564, Vesalius suddenly left Madrid and the court, and went on a pilgrimage to Jerusalem. The circumstances which led to this strange step are very doubtful. The story commonly received is, that having obtained leave from the friends of a Spanish gentleman, who had apparently died under his care, to examine the corpse, he proceeded to the dissection, and the heart, on removing it from the body, quivered in his hand. The friends, hearing of this, accused him, not of murder only, but of impiety, before the Inquisition; and it was only by the intercession of Philip II. that he was permitted to expiate his error by a pilgrimage. There is no other evidence for this tale than that it was current not long after Vesalius's death; and, on the whole, it seems more probable that he left Spain in consequence of being mixed up in some of the political or court plots which were at that time very numerous, and of the results of which, as he was of a melancholy disposition, he might very well be in fear. Whatever led to his pilgrimage, its end was most disastrous. While he was at Jerusalem, in 1564, Fallopius died, and the Venetian senate invited him to the vacant professorship of anatomy. On his voyage to Padua, his vessel was wrecked on the isle of Zante, and there the great Vesalius died of starvation, according to the accounts of some, but, as it seems more probable, of the fatigue and exposure which he had suffered.

Besides the works already mentioned, the only others that can certainly be ascribed to Vesalius are some 'Consilia,' published in the collections of Montanus, Garetius, Ingrassias, and Scholzius; and a paraphrase and translation of some of Rhazes' works. The 'Chirurgia Magna in septem libros digesta,' which Prosper Borgaruccius published at Venice, in 1568, and ascribed to Vesalius, was probably not written by him, but collected by the editor from the works of Fallopius and others.

Vesalius left a half-brother Francis, who refused to study the law, for which his parents had destined him, and commenced the pursuit of anatomy, that he might defend the memory of his brother from the attacks which were made on it, not less virulently for some time after his death than they had been during his life. But an early death prevented his design.

The whole of Vesalius's works and his Life were edited by Boerhaave and Albinus, at Leyden, in 1725, in 2 vols. folio. Portal's 'Histoire de l'Anatomie et de la Chirurgie,' t. i., p. 394, and Haller's 'Bibliotheca Anatomica,' t. i., p. 180, contain, together with the Life of Vesalius, analyses of his chief works.

VESICANTS. [Blisters.]

VESOUL. [Saône, Haute.]

VESPASIA'NUS, TITUS FLA'VIUS, was born near Reate, in the Sabine country, on the 17th of November, A.D. 9. The Flavian gens had never obtained distinction, though some of its members were mentioned in the history of the later period of the republic and the commencement of the empire. (Sueton., *Vesp.*, i.) Vespasian was educated by his paternal grandmother Tertulla, at her estate near Cosa in Etruria, and when emperor he displayed his affection for the place, and instituted rites in honour of his grandmother's memory. He served in Thrace as military tribune, and having held the magistracies of aedile and quaestor, in the latter of which he had for his province Crete and Cyrenaica, he became praetor. He had great difficulty in obtaining the aedileship or the quaestor-ship (the uncertainty of the text of Suetonius leaves it doubtful to which of the two magistracies this statement refers), but the praetorship was conferred on him at his first petition, probably through the influence of Caligula, who honoured him with a seat at his table. For this favour Vespasian thanked the emperor in the senate. He called for extraordinary games at Caligula's mock triumph over the Germans, and proposed that the bodies of conspirators against the emperor should be left unburied. These statements fix his praetorship at the third year of Caligula, A.D. 39.

At this time he married Flavia Domitilla, by whom he had two sons, who afterwards became the emperors TITUS and DOMITIANUS, and a daughter, Domitilla.

Vespasian distinguished himself as a soldier in the reign of Claudius, first in Germany, where he obtained the station of legatus, by the influence of Claudius's freedman Narcissus (A.D. 41-42). Thence he was transferred to Britain (A.D. 43), where he served as legatus in the expedition under Aulus Plautius, and under Claudius himself, with such distinction that the triumphal honours were granted to him, and after receiving two priestly offices within a short time, he was advanced to the consulship, which he held as Consul Suffectus during the last two months of the year 51 A.D. During the interval between this time and his proconsulship he remained quiet through fear of Agrippina, who was bitterly hostile to the friends of Narcissus. It was therefore probably after her murder (A.D. 59) that he governed Africa as proconsul. He returned, after an upright and honourable administration, in such pecuniary embarrassment that, after mortgaging all his landed property to his brother, he was compelled to trade in slaves in order to support his rank. From this circumstance he obtained the nickname of Mulio. He accompanied Nero in his tour through Greece (A.D. 67), but having offended the emperor by falling asleep or leaving the room in the midst of his poetical performances, he was banished from the court, and had retired to an obscure city, when Nero appointed him to command in the war against the revolted Jews with an army of three legions. In less than two years he had conquered the whole of Judaea except Jerusalem [JEWS; JERUSALEM], when he was persuaded by his son Titus, and by Mucianus, the proconsul of Syria, to assert his claim to the imperial throne, which had been already marked as his by repeated omens. (Sueton., *Vesp.*, v.) The interval during which Galba, Otho, and Vitellius were struggling for the purple was spent by Vespasian in secret preparations, so that when he was proclaimed emperor at Alexandria, by Tiberius Alexander, the prefect of Egypt, on the 1st of July, A.D. 69, his cause was immediately espoused by the legions of Judaea and Syria, by three legions in Moesia, and by two in Pannonia. The legions of Moesia and Pannonia were brought over by Antonius Primus, who, without waiting for the commands of Vespasian, or for the aid of the Syrian legions, marched at once into Italy. The councils of Vitellius were betrayed by Cæcina, the Consul Suffectus, and his army, though superior in numbers to that of Antonius, was completely routed by the latter in a nocturnal battle between Bedriacum and Cremona. Antonius now advanced slowly towards Rome, receiving by the way the submission of the Italian cities, while Vitellius, in a state of the utmost indecision, left his cause in the hands of the populace of Rome, who compelled Vespasian's brother Sabinus, the prefect of the city, to take refuge with his adherents in the Capitol, which they then burnt. The arrival of Antonius at once subdued the mob; Vitellius was dragged from his hiding-place, and cruelly put to death on the 24th of December, and the authority of Vespasian was established in Rome. [VITELLIUS.]

The emperor now proceeded to Rome, leaving the reduction of Jerusalem to his son Titus. He arrived in the city at the end of the summer of the year 70 A.D., the Senate having in the mean time appointed him, with his son Titus, to the consulship, and conferred upon him all the accustomed imperial honours. His government has obtained the highest praise. He restored the privileges of the Senate, reformed the courts of justice, restored discipline to the army and order to the finances. He repaired the devastations which Rome had suffered in the recent civil wars, and adorned the city with many new buildings. Among the buildings which he began or completed were the restoration of the Capitol, the temples of Peace and of Claudius, and, above all, the Amphitheatre, which has become celebrated under the name of the Coliseum.

Temperate in his own habits, he exerted himself to restrain luxury in his subjects, and himself discharged the duties of the censorship. He was affable to his friends, and even suffered severe strictures on his conduct to pass unpunished. The banishment and death of Helvidius Priscus are said to have been executed against the will of the emperor. He was fond of money, but what he exacted from his subjects he spent on public works, not on his own pleasures. He was a liberal patron of literature and art.

The reign of Vespasian was signalized by great military successes, of which the most important were the victories of Petilius Cerealis over the Treviri (A.D. 70), those of Agricola in Britain, and the conquest of Jerusalem, for which the emperor and his son Titus triumphed in the year 71, when the temple of Janus was shut, and that of Peace was built. In the following year the kingdom of Commagene was taken from Antiochus and added to the Roman empire.

In the last year of his reign a conspiracy was formed against him by Aulus Cæcina and Epirus Marcellus, who were detected and put to death. Not long after this Vespasian died of a fever, on the 23rd of June, A.D. 79, in the 70th year of his age and the 10th of his reign.

(Tacitus, *Histor.*; Suetonius, *Vespasian.*)

VESPERTILIO'NIDÆ. The reader will find this extensive family treated of under the article CHEIROPTERA.

Mr. Swainson is of opinion that the passage to the *Vespertilionidæ* may be considered as established by the Flying Lemurs [PLEUROPTERA], and adopts Mr. J. E. Gray's arrangement, as much more natural than that of Cuvier; he gives the following table of the primary divisions of the former:—

Vespertilionidæ (Gray). The Bat Family.

1. *Typical*	Nasal appendages complicated, membranaceous; index finger of one joint: wings large and broad.	Rhinolophinæ.
2. *Subtypical*	Nasal appendage simple, fleshy, solitary, or double; the index finger of two joints.	Phyllostominæ.
3. *Aberrant*	No appendage.	
	Grinders bluntly tubercular; index finger 3-jointed, clawed; head long, hairy; tail often wanting.	Pteropinæ.
	Grinders acutely tubercular; index finger 2-jointed; wings large, narrow; head short, blunt; lips very large.	Noctilioninæ.
	Grinders acutely tubercular; index finger 1-jointed; wings large, broad; tail long; head long, hairy; tongue short; lips simple.	Vespertilioninæ.

Mr. Gray, in the last edition of the *Synopsis of the Contents of the British Museum*, remarks that the Leaf-nosed Bats (*Istiophori*) have the nostrils placed in a separate bald space, which is often elevated behind into a leaf: their teeth are acutely tubercular, and their index-finger is not clawed.

The true Leaf-nosed Bats (*Phyllostominæ*) have the nasal disk expanded into a distinct leaf, which is simple behind and pierced with the nostrils in front: these are peculiar to warm climates. Those which are only found in the New World are remarkable among bats for having four joints to their middle finger. Those which are found in the Old World, like the rest of the family, have only three joints to the middle finger.

The Horse-shoe Bats (*Rhinolophinæ*) have the nasal disk expanded into a leaf behind, and with a pit or process between the nostrils in front.

The True Horse-shoe Bats have a long tail inclosed in a large interfemoral membrane, and there is a process between their nostrils: these are found in the Old World only.

Mr. Gray states in continuation, that the remainder of he Bats have been called Simple-nosed Bats (*Anistiophori*), ecause their nostrils are simply pierced in the end of the uzzle without any nasal disk.

The tribe of True Bats (*Vespertilioninæ*) have, he observes, cutely tubercular grinders, broad and large wings, with n elongated tail, as long as, and inclosed in, a large conial interfemoral membrane. The upper cutting-teeth are ear the canines, and separated by a space from those of he opposite side. Their generic distinctions depend, rincipally, on the form of the nostrils and ears.

The Bull-dog Bats (*Noctilioninæ*) have acutely tuberular grinders, and feed on insects, like the True Bats; ut their wings are very long and narrow, their bodies hin, and their tails thick. Their lips are, in general, very hick and prominent, resembling in appearance those of a ull-dog. Their generic distinctions depend principally n the position of the tail. Warm climates generally.

The last tribe of Simple-nosed Bats (*Pteropinæ*), according to Mr. Gray's arrangement, live almost entirely on ruit. They are characterized by having bluntly tubercuar grinders, and the end of the fore-finger furnished with claw; they have a simple nose with rather tubular ostrils placed on the side of the muzzle; their thumb is ong and webbed at the base; the interfemoral membrane short, and they have only a very short tail or none. ound only in the warm parts of the Old World and the ustralian islands, where they are called Flying Foxes. he following is Mr. Gray's latest arrangement (1842):—

Fam. 6. Vespertilionidæ.

Subfam. 1. *Phyllostomina.*

Genera:—*Arctibeus; Phyllostoma; Carollia; Lopho-*
loma; Macrophyllum; Brachyphyllum; Diphylla;
tenoderma; Endostoma; Phyllophora; Glossophaga;
lonophyllus; Anoura; Rhinopoma; Megaderma; Laria.

2. *Rhinolophina.*

Genera:—*Ariteus; Rhinolophus; Hipposideros; Asel-*
a.

3. *Vespertilionina.*

Genera:—*Nycteris; Nyctophilus; Barbastellus; Pleco-*
m; Romicea; Vespertilio; Furia; Natalus; Myopterus;
Capacinus; Scotophilus; Lasiurus.

4. *Noctilionina.*

Genera:—*Taphozous; Noctilio; Proboscidea; Centro-*
ycteris; Embalonura; Ællo; Chilonycteris; Mormops;
teronurus; Cheiromeles; Nyctinomus; Thyropterus;
lolossus; Dinops; Myopteris; Diclidurus.

5. *Pteropina.*

Genera:—*Pteropus; Cynopterus; Epomophorus; Ma-*
oglossa; Harpyia; Cephalotes; Acerodon.

Vampyrus, belonging to the *Phyllostomina*, is omitted pparently by an error of the press, for Mr. Gray speaks f the genus as belonging to that subfamily in his preatory remarks) in this list of genera. The true Vampires ave a deep fissure in the centre of the lower lip, into hich their tongue fits; and we would add the following idence of their feeding on the blood of living animals to at given in the article VAMPIRE:—

Mr. Waterton, a very good observer, relates that *the* ampire in general measures about 26 inches from wing wing, though he once killed one which measured 2 inches. He says that this bat frequents old abandoned ouses and hollow trees; and he states that, sometimes, a luster of them may be seen in the forest, hanging head ownwards from the branch of a tree. According to him ere are two species in Guiana, a larger and a smaller: e former sucks men and other animals; the smaller seems confine itself to birds chiefly. He learned from a gentlean, high up in the river Demerara, that the latter was ompletely unsuccessful with his fowls on account of the mall vampire. This luckless proprietor showed Mr. Vaterton some that had been sucked the night before and ere scarcely able to walk.

Mr. Waterton twice notices the fact of the great toes of is sleeping companions being sucked, though he never aught the animal in the act of sucking. The hole made y the bite of the beast is described as triangular, something like that which is produced by the bite of a leech, ut smaller. The operator is said to be so skilful, that the atient sleeps profoundly while the vampire sucks, and ften loses many ounces of blood.

The species of *Vespertilionidæ* recorded by Mr. Bell, n his interesting *History of British Quadrupeds*, are—he Great Bat or Noctule, *Vespertilio noctula*; the Hairy-armed Bat, *Vespertilio Leisleri*; the Parti-coloured Bat, *Vespertilio discolor*; the Common Bat, Flittermouse or Pipistrelle, *Vespertilio pipistrellus*; the Pygmy Bat, *Vespertilio pygmæus*; the Serotine, *Vespertilio serotinus*; the Mouse-coloured Bat, *Vespertilio murinus*; Bechstein's Bat, *Vespertilio Bechsteinii*; the Reddish-grey Bat, *Vespertilio Nattereri*; the Notch-eared Bat, *Vespertilio emarginatus*; Daubenton's Bat, *Vespertilio Daubentonii*, the Whiskered Bat, *Vespertilio mystacinus*; the Long-eared Bat, *Plecotus auritus*: the Lesser Long-eared Bat, *Plecotus brevimanus*; the Barbastelle, *Barbastellus Daubentonii*; the Greater Horse-shoe Bat, *Rhinolophus ferrum-equinum*; and the Lesser Horse-shoe Bat, *Rhinolophus hipposideros*.

VE'SPIDÆ. The insects of the order *Hymenoptera*, composing the genus *Vespa* of Linnæus, of which the common Wasp and the Hornet are familiar examples, were formed into a family by Latreille, under the name of *Diploptera*, afterwards changed into *Diplopteryga* by Kirby. They form the third and last division of the first subsection (*Prædones*), of the second section (*Aculeata*) of *Hymenoptera*, in Westwood's revision of Latreille's arrangement. When at rest they fold their wings throughout their entire length, whence their distinctive appellation. The wings of all the insects of the family have a similar neuration, their eyes are lunate, and there are glands at the extremity of the labrium. The fore-wings have one marginal and three perfect submarginal cells, with an incomplete terminal submarginal cell.

Whilst some of these characters are so peculiarly distinctive of the *Diplopteryga* that they are not to be seen in any other insects of the order, they, strange to say, do not at all indicate a community of habits. Among the Wasps are insects of the most dissimilar habits; some solitary, others living in societies, some phytophagous, others carnivorous. Such as are social rival the bees in the complicated instincts which regulate their societies. At first sight these great differences of manners would seem to point to a classification superior to that founded on such unimportant characters as the folding of the wings, &c. But when we find on further inquiry that the latter apparently insignificant distinctions correspond to essential modifications of structure common to all the insects of the family, we are led to conclude that among the wasps, structure, and not economy, is the real source of essential character. Some authors, laying greater stress on habit than on structure, have been inclined to separate far apart the social from the solitary wasps; but the utmost to which a separation can be admitted is that arrangement adopted by Mr. Westwood, viz. the division of the *Diplopteryga* into two families, the *Eumenidæ* and the *Vespidæ*.

Besides the characters already mentioned, the wasps are distinguished by the form of the antennæ, which are usually angled and somewhat clavate at their extremities. Their tongues are trifid and lacineated at the tips; the palpi are short and filiform; the maxillæ long and compressed; their eyes are notched; the thorax is entire. The bodies of the wasps are usually black, with yellow markings, the males differing from the females in having the clypeus not marked with yellow spots. They are naked, or but slightly hairy. The abdomen is often pedunculated, and the females and neuters are provided with a powerful sting. Their legs are unprovided with apparatus for the collection of pollen.

The solitary wasps, each species of which comprises males and females only, constitute the family *Eumenidæ*. The genera *Eumenes* and *Odynerus* belong to it. Their peculiarities of organization are adaptations to their peculiarities of habit. Thus the mandibles form a kind of rostrum, resembling that of the *Fossores*, for the purpose of seizing and carrying off the insects on which they prey. The antennæ are composed of 12 or 13 distinct joints, according to the sex, and are pointed. The labrum is divided into four pilose setæ, with glands at their extremities; the lateral ones narrow and pointed, the intermediate longer. The clypeus is oval or heart-shaped, and anteriorly more or less truncate. The basal segment of the abdomen in the typical species is elongated into a peduncle. Their larvæ are fleshy grubs, with tubercles serving instead of feet.

The habits of the solitary wasps are interesting. Réaumur informs us that the *Odynerus murarius* (*Vespa muraria*) of Linnæus, makes a hole several inches deep in the sand, year, 1056, Pope Victor went to Germany at the desire of Henry III., and was there present at the death of the emperor, which took place in that year. Victor remained in Germany with the dowager empress Agnes, and her infant son Henry IV., till the next spring, 1057, when he returned to Italy. Pope Victor died at Florence in the same year, and was succeeded by Stephen IX.

VICTOR III., Desiderius, abbot of Monte Casino, was elected by the cardinals assembled at Salerno, after the death of Gregory VII., in compliance with the wish expressed by that pope on his death-bed, A.D. 1085. Desiderius however declined the proffered dignity, and the Church remained without a pontiff till Easter of the following year, 1086, when Desiderius, having gone to Rome, was invested with the papal garments by the assembled cardinals, and proclaimed by the name of Victor III. But the prefect of the emperor Henry IV., who had possession of the Capitol, and who supported the antipope Guibert, who had been already set up in opposition to Gregory VII., opposed the consecration of the new pope. After four days Desiderius left Rome and returned to Monte Casino, having deposed his pontifical robes at Terracina and renounced his dignity. During the Lent of the next year, 1087, a Council was held at Capua, in which Desiderius was prevailed upon to resume the papal office for the good of the Church. The new pope then proceeded towards Rome, accompanied by the cardinals and many of the Roman nobility, and by a body of troops given to him by the prince of Capua, and by Roger, duke of Apulia. On arriving outside of Rome, they defeated the troops of the antipope, and drove him away from the Vatican. On the Sunday after the Ascension, Pope Victor was solemnly crowned in St. Peter's church, after which he returned to Monte Casino, as the city of Rome was still occupied by the partisans of the antipope. Soon after however the Countess Matilda arrived near Rome from Tuscany with a large force, and invited Pope Victor to a conference, which took place in the Vatican in the beginning of June. On St. Barnabas'-day, 11th of June, the pope and the countess, having forced the passage of the Tiber, entered Rome amidst the acclamations of the people.

On the eve of St. Peter's-day, 28th of July, a messenger from Henry IV. having threatened the consuls and senators of Rome with the displeasure of the emperor if they continued to adhere to Victor, the Romans turned against the pope, and drove him and his friends out of the town. Pope Victor however retained possession of the Vatican, and celebrated mass on the next day in St. Peter's church. A few days after, Pope Victor thought proper to abandon Rome altogether, and withdrew to Monte Casino, and from thence to Beneventum, where he held a Council in the month of August, in which he anathematized the antipope Guibert, as well as Hugo, archbishop of Lyon, who had declared himself for the antipope, and had written a violent letter to the Countess Matilda, in which he strove to blacken the character of Pope Victor, charging him with ambition, cunning, and other vices. This letter, which is inserted in Labbe's 'Concilia,' probably gave rise to the several accusations against the memory of Pope Victor, which are found in the Chronicle of Augsburg and other compilations. Whilst the Council was sitting, Pope Victor fell dangerously ill of dysentery. He hastened back to his favourite residence of Monte Casino, where he died on the 16th of September, 1087, after having recommended the cardinals who were about him to choose Otho, bishop of Ostia, for his successor, who was accordingly elected by the name of Urban II. (Muratori, *Annali d'Italia*, and the authorities therein quoted.)

Pope Victor III. is better known in the history of learning as Desiderius, abbot of Monte Casino. In his convent he was a great collector of MSS.; he employed amanuenses to copy the works of the classics; he restored or rather rebuilt from the foundations the church and part of the convent upon a much larger scale than that of the former structure, and he sent to Constantinople for skilful workmen in mosaic and joinery to assist in adorning the church.

(Peregrinius, *Series Abbatum Cassinensium*; Tiraboschi, *Storia della Letteratura Italiana*.)

VICTOR IV., Antipope. Octavian, cardinal of St. Clement, was set up by a small faction of cardinals, supported by the emperor Frederic I., in opposition to Pope Alexander III., A.D. 1159. This created a schism in the Church, which continued even after the death of the antipope Victor, which took place in 1164. [FREDERICK I., Emperor.]

VICTOR, AMADEUS. [SARDINIAN STATES.]

VICTOR, SEXTUS AURELIUS. [AURELIUS VICTOR.]

VICTO'RIA. [VENEZUELA.]

VICU'NA, or VICUGNA. [LLAMA, vol. xiv., pp. 73, 74.]

VIDA, MARCO GIRO'LAMO, born at Cremona about the year 1490, studied at Padua and Bologna, and distinguished himself in the classical studies, and especially in Latin poetical composition. He afterwards entered the order of the regular canons of the Lateran. He went to Rome about the beginning of the pontificate of Leo X., who happening to see his little Latin poem on chess, 'Scacchia ludus,' and another entitled 'Bombyx,' or the Silkworm, took him into favour, and urged him to undertake the composition of a more important and regular poem on the life of our Saviour, and in order to enable him to apply himself undisturbed to his poetical studies, the pope bestowed upon him the priory of San Silvestro at Frascati. Vida accordingly began his poem entitled 'Christiados,' of which he presented two cantos to Leo X., who praised them greatly, but the poem was not finished for many years after. Meantime he published, in 1527, his didactic poem 'De Arte Poetica,' which has been extolled by Scaliger, Batteux, and other critics, as being his best work. It has been translated into English, and has been praised by Dr. Johnson, and by Pope, in his 'Essay on Criticism.'

Clement VII. appointed Vida Apostolic Protonotary, and in 1532 made him bishop of Alba in Piedmont. Ughelli, in his 'Italia Sacra,' speaks at length of the meritorious conduct of Vida during the thirty-four years that he administered the see of Alba. When the French besieged that place in 1542, the bishop assisted at his own expense the poor inhabitants, and supported the spirit of the garrison until the besiegers were obliged to raise the siege. Vida afterwards repaired to the Council of Trent, where he became intimate with the cardinals Pole, Cervini, and Dal Monte, and with the learned Marcantonio Flaminio, and in the familiar conversations which he had with them he conceived the plan of his dialogues 'De Dignitate Reipublicæ,' which he afterwards published and dedicated to Cardinal Pole. In the year 1549, on the occasion of a dispute about precedence between the towns of Cremona and Pavia, the citizens of the former intrusted their townsmen Vida with the defence of their claims, which were to be laid before the senate of Milan for its decision. Vida wrote three orations: 'Cremonensium Actiones Tres adversus Papienses in Controversia Principatus.' In these compositions Vida gave way perhaps too much to municipal feelings, and indulged in invective against the people of Pavia, for which his orations were called Vida's 'Verrinæ.' Giulio Salerno, on behalf of Pavia, replied to Vida, in his 'Pro Ticinensibus adversus Cremonenses de Jure Possessionis,' which however were not printed, as the question was dropped.

Vida died at Alba, in September, 1566, and was buried in the cathedral of that town. It seems that he died poor. Besides the works mentioned in the course of this article he wrote sacred hymns in Latin, and other minor compositions both in Latin and Italian. Vida was one of the most learned scholars and most elegant Latin writers of the 16th century. His contemporary Sadoleto, a competent judge, affirms that his Latin verse approached near to the dignity of classical poetry. His poem on the Life of Christ, in six books, is a close imitation of Virgil, for which the author was styled 'the Christian Virgil.' Vida wrote also a small poem on the challenge and fight between thirteen Italians and the same number of Frenchmen in Apulia, in February, 1503, in which the Italians remained victorious. Of this inedited poem a fragment was published at Milan in 1818: 'Marci Hieronymi Vidæ XIII Pugilum Certamen.' There is an account of this same occurrence in Italian prose: 'Istoria del Combattimento de' tredici Italiani con altrettanti Francesi, fatto in Puglia tra Andria e Quarati,' by a contemporary and a spectator of the fight, which has furnished the subject of Azeglio's historical novel, 'Ettore Fieramosca o la Disfida di Barletta.'

(Corniani, *I Secoli della Letteratura Italiana*; Tiraboschi, *Storia della Letteratura Italiana*; Giraldi, *De Poetis Suorum Temporum*; and the biography of Vida, in the edition of his works published at Oxford, 1722.)

escribed about this ellipse, and KLM be always perpen-icular to Cc, the law of the motion of the particle L is at M moves uniformly round the circle, or K moves rough a simple vibration. This is exactly the law of otion shown by Newton to obtain when the particle L is ttracted towards O by a force which varies as its distance om O; and mechanical considerations might easily be sed to establish the whole theorem. If the vibrations be us compounded for each pair of axes, three ellipses are btained on the three co-ordinate planes, which are the rojections of the ellipse which the particle describes in ace.

We may attempt to compound two different vibrations the same line, that is, two vibrations of different dura-ons. If in the first figure we suppose the angular ve-ocity of R round Q to be different from that of Q round , we see that R describes a TROCHOIDAL CURVE, and sup-osing such a curve to be described by uniform circular otions, the motion of the projection of R upon the line vibration will show the effect of the two vibrations. me simple instances may be readily obtained from the agrams in the article cited; but an attempt at a de-ription of the multifarious effects of even two vibrations ould baffle all human power of classification.

We now proceed to some account of the principal me-anical considerations connected with vibrations. If any stem whatsoever be slightly disturbed from a position of ble equilibrium, every particle makes an effort to return that position; and it can be shown that the force of stitution varies as the distance from the position of equi-rium, so that all the particles perform either simple brations, or motions compounded of simple vibrations. ot that it is accurately and geometrically true that the ce of restitution always varies as the distance from the sition of equilibrium, but only exceedingly near to it. e consequence of the restitutive force is, that the system, returning to its position of equilibrium, acquires velocity, d the several particles pass through or near to their sitions of equilibrium with their several velocities, until force of restitution, which begins to act in a contrary ection the moment the position of equilibrium is passed, stroys the acquired velocity, and causes the particles to turn. The same vibration is then repeated, or rather would repeated if there were no retarding forces: as it is, the istance of the air, &c., continually diminish the extent the vibrations, until at last they become insensible. But an be satisfactorily shown that these resistances have sensible tendency to alter the times of the vibrations; d few persons are aware how much of their comfort de-ds upon this circumstance. Whenever a sound is pro-ced, a musical note generally accompanies it; the nd is the consequence of the vibrations excited in the turbed system, and the permanency of its musical pitch he consequence of these vibrations being all made in same time, or very nearly so. The air does not retain vibrations communicated to it, but passes them on, so speak; and it is therefore an agent which communicates successive vibrations of a disturbed body just as they communicated to it. If the vibrations gradually ckened in their *times*, as they do in their excursions from effect of the resistances, the consequence would be at there would be no sustained notes, but every sound uld be a sliding chromatic descent, like the cry of some imals, which are therefore considered very annoying ghbours; and most musical instruments would be ren-ed unusable.

There is a principle in mechanics which is called that he *coexistence of vibrations*, and sometimes the *super-ition of vibrations*, which seems to be only a particular e of what might be called the coexistence or super-ition of small changes of any kind. If a set of small rations be given to any system, solid or fluid, the dis-bance of any particle at any one instant, arising from the *ted* effect of the vibrations, will be the sum or difference he disturbances arising from the several different vibra-ns, according as they are in the same or opposite direc-s. This is not strictly true in any case, but it is very rly true when the vibrations are small, and the more rly so the smaller the vibrations are. For instance, stones are dropped into water at two different places, at a certain time, on a certain part of the surface, the lting waves cross one another. If there be a particle ch is at the same time raised on both waves, a tenth of an inch say, from one only, and three-tenths of an inch from the other, that particle will altogether be raised four-tenths of an inch, or insensibly near to it. Thus the effects of the two waves travel without any apparent interference with each other, and the eye can easily follow any one wave, even though a dozen disturbances should have been excited at the same time. A handful of small pebbles thrown into smooth water will show the coexistence of the resulting waves very satisfactorily; and it is curious to observe how readily the non-interference of the several disturbances is seen when looked for, so readily, that it never is looked for unless the attention is specially directed to it.

What we know of the vibrations of bodies, except from mechanical deduction, amounts almost to nothing. When a sensible effect is produced, such as sound or light, our perceptions enable us to examine nature with great success. But on the vibrations of bodies, except so far as they communicate with us by an interposed elastic medium, little has been done, either mathematically or experimentally. If sand or non-adhesive powder of any kind be strewed upon a surface, the mode of vibration of that surface may be estimated by the displacement of the sand, which will be thrown away from the parts which vibrate, towards those which are at rest. In this manner Chladni examined the vibrations which can be produced in a rectangular plate of glass, fixed at one end, and excited in various manners by the bow of a violin rubbed against the edges. And thus he found that the lines which are at rest when a plate is excited into vibration comprise many curious symmetrical curves. In a paper printed in the 'Philosophical Transactions' for 1833, Mr. Wheatstone has made what we think is certainly the most decided step towards knowledge of the subject which has yet been made. He shows that all Chladni's figures and others may be produced by the superposition of rectilinear vibrations: that is to say, by motions compounded of those in which the lines of rest are parallel straight lines, and every line parallel to a line of rest is similarly raised or depressed throughout, at any one instant. The great difficulty in conceiving properly the modes of vibration of solid bodies lies in want of knowledge of the fundamental forms out of which all others are to be compounded; and as far as the bodies go which he has considered, Mr. Wheatstone has made an important addition to this power of conception.

VIBURNUM, a genus of plants belonging to the natural order Caprifoliaceæ. The species consist of shrubs with opposite petiolate leaves and corymbose flowers. The limb of the calyx is 5-cleft, permanent; the corolla rotate, subcampulate, and tubular; the fruit a berry, ovate or globose, with 1 seed by abortion, and crowned by the calycine teeth. The species are natives of Europe, America, and Asia, and are of easy culture in British gardens. Some of them were known to the Greeks and Romans, though the species have not been always identified.

V. Tinus, the Laurustinus, has ovate-oblong, quite entire, permanent leaves, with the veins beneath furnished with glandular hairs; the corymbs flat; the flowers white, rose-coloured before expansion; berries dark blue. This plant, now so common throughout Europe, and the most general inhabitant of the gardens of Great Britain, is a native of the south of Europe and the north of Africa. It was introduced into England in 1596. Its ancient name was *Tinus*, and, from its resemblance to the laurel, *laurus*, it was called Laurustinus. There are several varieties of this plant known in gardens. *V. T. hirta* has oval-oblong leaves, hairy beneath and on the margins. It is a native of Portugal, Spain, and the vicinity of Nice. *V. T. lucida* has ovate-oblong leaves, glabrous on both surfaces and shining. It is a more delicate plant than the other varieties; the leaves are much larger and more shining, and the branches fewer. It is native about Algiers and on Mount Atlas. It seldom blossoms till the spring.

All the varieties of Laurustinus are hardy shrubs, are evergreen, and bear the climate of Great Britain well: most of them blossom from November till April, and sometimes during May and June. Under these circumstances they have become general favourites, and although they do not bear the smoke of towns well, there are few gardens, however small, within from 5 to 20 miles of London, that are not ornamented with them. They are well adapted for 'fencing flower-garden hedges, and for varying the low iron palisades, pales, or brick-walls which separate the

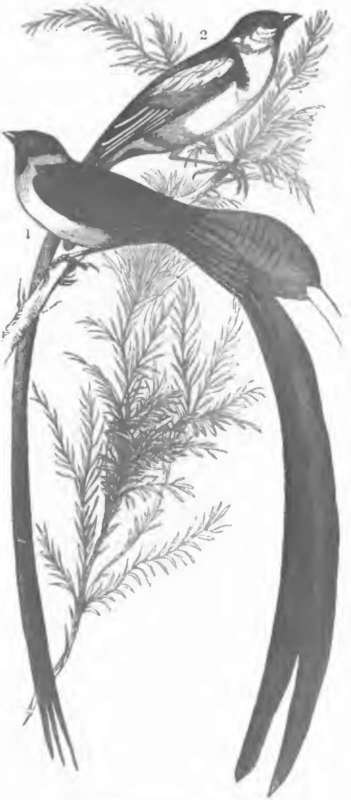
The tail-feathers are black: the four lateral ones on each side are slightly graduated, each being a fraction of an inch, sometimes about a quarter, longer than the one above it. The two next are the long vertical externally convex feathers, so conspicuous in the male. These in fine specimens measure a foot in length from the base, and about three-quarters of an inch in width. The two middle feathers, also placed in a vertical direction, have very broad webs on their basal half (about three inches), but the remainder of the shaft becomes a plumeless hair-like process (somewhere about three inches more). Bill and feet black. Size about that of a canary.

This is *Emberiza paradisea*, Linn.; *Grande Veuve d'Angola*, of the French; *Whidah Bunting* of English ornithologists; *Widow Bird* of the English salesmen and fanciers.

Locality.—Senegal (where it is very common) and South Africa.

A living bird of this species confined in the semi-circular aviary in the garden of the Zoological Society in the Regent's Park has just dropped its tail-feathers and is now (last week in March, 1843) moulting. Its habitat is marked 'South Africa.' When *Vidua paradisea* moults it is variegated with brown rusty colour, and white.

Vidua erythrorhynchus, Sw.



1, Vidua paradisea; 2, Vidua erythrorhynchus.

Description.—Mr. Swainson describes the *Red-billed Whidah Finch* as of less size than *Vidua paradisea*, and he considers it as altogether an aberrant species of the group. The bill is shorter, thicker, and broader at the top, so as to resemble that of *Amadina*. Of the four middle greatly elongated tail-feathers, two are convex, and two (one within the other) concave, so that when the four are closed, they form a sort of cylinder; and, but for their extremities, appear at first sight as one. Ordinary tail-feathers, four on each side, slightly rounded. Tertials, or at least one of them, as long as the primaries.

General colour of the adult deep glossy blue-black, which covers the crown and the back, between which is a pure white collar; the wings and scapulars marked with similar colours; lower part of the back and margin of the tail-covers white, a large spot of which spreads over nearly all the wing-covers. Ears, sides of the head, and all the under parts pure white, but the black colour of the back advances on the sides of the breast, so as to form a half collar, open in front. Tail-feathers black externally, white internally, the latter colour predominating on the outermost feathers. In a Senegal specimen there was a deep black spot on the chin, of which there was no trace in another of uncertain locality.

Locality.—Senegal.

This also is the *Emberiza vidua* of Linnæus and authors, according to Mr. Swainson, who remarks that there seems to be considerable confusion between three of the Whidah Birds described by Linnæus as distinct species, under the names of *Emberizæ vidua*, *principalis*, and *serena*. But, he adds, there is no published evidence whatever to authorize our uniting all three under one specific name; and that authors have omitted to notice the white under colour and also the black spot on the chin. With regard to the absence or presence of the black spot on the chin, Mr. Swainson inquires whether the birds with and without that spot are varieties, of different sexes, or from different localities?

VIECHE, or VIETZA, was the appellation of the antient Slavonian popular assemblies, supposed to be derived from the Slavonian verb *vieshchat*, 'to announce, or to proclaim.'

These assemblies were customary among all the Slavonian nations, but the appellation of Vietza, or Vieche, was given to them in Poland and in Russia. The courts of justice held by the kings of Poland during the early period of their history were called Vietza, and the same name was applied to provincial assemblies, which was afterwards superseded by that of *Seymiki*, that is, little diets, *comitiola*.

The republic of Novgorod was entirely governed by the vieche. This assembly, at which all the citizens had a right to vote, was held in an open space before the cathedral church. It was called together by the tolling of the great bell of the Vieche, which was made use of only on those occasions. The citizens held previous consultations in the five separate quarters of the town, and then all together in the above-mentioned place before the cathedral church, where all the affairs of state were finally decided by a majority of votes.

Neither the prince nor the magistrates took any part in the deliberations of the vieche, because, as it was expressed in a popular proverb, 'the free Novgorod was judging himself by his own judgment.'

The vieche decided war and peace, elected the prince, the Possadnik, or chief magistrate, the military commanders and inferior officers, the ambassadors who were sent to foreign powers, and even the archbishop. It likewise deposed all those dignitaries, and could condemn them to exile, and even to death. It was not unfrequent for the condemned individual to be immediately executed by being thrown from the bridge into the river.

The constitution of Novgorod was entirely democratic. It had a prince who was elected by the Vieche from the dynasty of Ruric, which reigned in the several principalities into which Russia was divided from the eleventh century. The prince had the right to propose war and peace, to command the troops in time of war, and to receive a considerable part of the booty taken from the enemy. He had a court, certain revenues assigned to him, and several privileges, such as hunting in every part of the country. He could judge in criminal as well as in civil cases, but only in conjunction with the *Possadnik*. There were instances of princes chosen from the sovereign house of ithuania. Many princes were deposed from their dignity y the vieche, but many others, disgusted with the fickle- ess of popular favour, left it of their own accord. The ncertainty of their tenure may be judged by the fact, that iovgorod had in one century more than thirty princes.

The possadnik was always elected from among the citi- ens; his dignity was similar in every respect to that of ie chief burgomaster in the Hanse towns of Germany. The uration of the office seems not to have been determined ith precision, because there are many cases of possadniks ho occupied it during their lifetime, while many others ere repeatedly re-elected. Several were deposed by the eche, and sometimes murdered in secret. The thousand en (Tissiatzki) were a kind of tribunes who watched er the possadnik and the prince, lest they might usurp an egal authority and injure the freedom of the citizens. hey also acted in a judicial capacity, and were assisted minor magistrates, called hundred men (Sotniki).

The republic of Pskow or Plescow was governed in the me manner, but it was frequently obliged to receive ders from the vieche of its stronger ally, or, as it was lled, its elder brother, Novgorod. The vieches of the o republics were abolished on their subjection to the and-duke of Moscow; Novgorod in 1477, and Pskow in 09, and the bells employed for summoning those assem- ies were carried to Moscow. The chronicles mention eches held on several occasions at Kiev, Vladimir, and her towns of Russia. A similar assembly took place at oscow in 1382, when the grand-duke had left his capital the approach of the Tartars.

The provincial towns of the republics of Novgorod and kow had their local vieches, which were however entirely bject to that of the capital, and were assembled only for ie execution of its orders. The republic of Viätka, VIATKA] having adopted the constitution of its mother- untry, was also governed by a vieche.

VIENNA (in German, *Wien*), the metropolis of the ustrian empire, is situated in 48° 10′ N. lat. and 16° 20′ long., on the right or south bank of the Danube, at its nfluence with the little river Wien, which flows through e city. Though Vienna is said to be on the right bank the Danube, it is full two miles from the main stream of e river, which divides above the city into several anches, forming many islands, so that only a small anch, which serves as a canal, and is generally called e Danube canal, passes under the walls. Vienna is in e province of Lower Austria, which is called the country elow the Ens, 716 Paris feet above the level of the sea, cording to Stein's statement; Blumenbach says 470 feet bove the level of the Mediterranean; Hormayer says 71·4 feet above the level of the Black Sea.

Vienna consists of the interior or old city and the iburbs. The old city is nearly circular, and not above iree miles in circumference. It is surrounded with a road fosse, and a wall from forty to fifty feet high, hich has ten regular bastions, and forms altogether what called the Bastei, now one of the most favourite pro- nenades of Vienna, commanding a very fine view. Beyond e fosse is the glacis, varying in breadth from 960 to 500 feet, formerly reserved as a clear space without the alls, but now laid out in public walks. It extends all round e city, except on the side next the Danube. The city is urrounded by the thirty-four suburbs, two of which are to ne north-east, on the island Leopoldstadt in the Danube, nd the thirty-two others beyond the glacis. These thirty- wo suburbs are surrounded by the lines, that is, a fosse ith a wall twelve feet high. From the old city twelve ates lead to the suburbs, the principal of which is the Burg-thor, or palace gate (the imperial palace being alled the Burg), which was completed in 1824, and is a plendid piece of architecture, with five equal archways. rom these gates there are paved streets and avenues to he principal streets in the suburbs, and these are con- ected by twelve other gates in the lines with the adja- ent country. The extent of the lines is twelve miles, and he circumference of the two suburbs situated on the sland is above six miles, making the entire circumference of Vienna above eighteen miles, including the windings, or though the general form approaches to the circular, here are many irregularities. The old city occupies about tenth part of the whole space.

The inner or old city is very irregularly built; most of he streets are crooked and narrow; the Places (open places) are twenty in number, ten larger and ten smaller, but they are all small and irregular; among the best are —the New Parade, before the imperial palace, the largest square in Vienna, nearly 1000 feet in length and 650 in breadth, perfectly regular, surrounded with avenues of trees, and adorned with grass-plots and flower-beds; 2, the Hof, 450 feet long and 300 broad; 3, the Hohe Markt, with a beautiful marble temple; 4, the Josephsplatz, in which there is a colossal equestrian bronze statue of Joseph II., erected in 1806; 5, the Graben, which is rather a street than a square, 540 feet long and 100 broad: it is nearly in the centre of the city, and is a place of fashionable resort, especially for strangers. The streets are in general well paved with granite; they are well lighted at night, and great care is taken to keep them clean, to which the capacious sewers essentially contribute. Differing in this respect from most other European capitals, the old city is the most fashionable: it contains the palaces of the emperor, of many of the principal nobility, the public offices, the finest churches, and most of the museums and public collections, the colleges, the exchange, and the most splendid shops. The houses, which are in general of brick, are very high, of five or six stories, and some even more, and very large, as may be judged from the fact that 1318 are occupied by 50,093 inhabitants; so that most of the houses are inhabited by several families, each occupying one floor, or part of one. There is a common staircase, and a porter keeps the street-door.

The public buildings, palaces, churches, &c. are very numerous. 1. The most remarkable is the cathedral, dedicated to St. Stephen, a very majestic edifice, built entirely of freestone, in a beautiful Gothic style, in the twelfth and thirteenth centuries: it is one of the finest specimens of antient German architecture. The interior is 342 feet in length, 222 feet in breadth between the two great towers, and 79 feet in height. The church has four towers, one of them among the loftiest in Europe: its height has been variously stated at 480, 445, and 430 feet; but it appears from the most correct measurement (according to Hormayer) to be 420 feet. In this steeple hangs the great bell, weighing 354 cwt., which the emperor Joseph I. caused to be cast, in 1711, out of 180 pieces of cannon taken from the Turks, when they were obliged to raise the siege of the city. The interior of the church contains thirty-eight marble altars and numerous monuments of celebrated men, among which are those of the emperor Frederic IV. and of Prince Eugene of Savoy. The crypt beneath the church consists of thirty large vaults, in which since the time of Ferdinand III. the bowels of all the deceased members of the imperial family are deposited in copper or silver urns, their hearts being deposited in the church of the Augustines and their bodies in that of the Capuchins. 2, St. Peter's, built on the model of St. Peter's at Rome, and adorned with fine fresco and oil paintings. 3, The elegant church of the Augustines, which contains the celebrated mausoleum of the archduchess Christina, a masterpiece of Canova, which cost 20,000 ducats. 4, The church of the Capuchins, with the imperial family vaults, where the bodies of the imperial family are deposited, beginning with the emperor Mathias and his consort. 5, St. Michael's, a magnificent edifice, containing some capital paintings. 6, St. Ruprecht's is remarkable only as the oldest Christian church in Vienna, having been built in 740, for the convenience of the heathen Avari; but little, if anything, remains of the original edifice. 7, The church of Maria Stiegen is the next oldest church, having been built in 882. It has been assigned to the newly constituted order of the Redemptorists (otherwise called Ligorists, from the founder Ligorio) to perform divine worship, and likewise to the Slavonian nation. 8, The church and abbey of the Scotch (so called from the Scotch Benedictines, who possessed it from 1158 to 1418). Besides these there are the Italian church, the German church, two chapels in the Burg, the church of the United (or Roman Catholic) Greeks, two churches of the non-united (or schismatic) Greeks. The Lutheran chapel and the Calvinist chapel have been built since 1785; they have neither steeples nor bells, and no entrance direct from the street, but through a court. The Jews have a synagogue and school.

The principal public buildings are—1, The Burg, the imperial palace, the residence of the emperor, an old irregular edifice, built at different times. It consists of three quadrangles. It contains the imperial jewel-office, servants in scarlet and gold-laced liveries, Hungarian lacqueys, and Bohemian yagers. The drive however is not the most characteristic part of the Prater. Not far from what may be called the Prater of the great world, that of the common people begins. It is called the Würstel Prater, not from würst, 'a sausage,' on account of the great quantity of sausages consumed there, as some tourists have conjectured, but from the many puppet-shows, called in Vienna Würstel-spiele. It is covered with innumerable liquor-shops, Russian swings, roundabouts, jugglers, and all sorts of diversions for the lower classes, who, on Sundays and holidays in the afternoon, repair thither in throngs. The whole is like a great fair or encampment of sutlers' booths; long rows of tables and benches are constantly supplied with guests, who seem to have no thought but to enjoy themselves. Adjoining the Prater is the Augarten, and next to that the Brigittenau, which are very agreeable walks, but not so frequented as the Prater.

The environs of Vienna are very picturesque. On the north it has the beautiful islands of the Danube; on the west the lofty Kahlenberg mountain; on the south, hills covered with thick forests and rich vineyards, the Noric Alps commencing with the Schneeberg (*i. e.* snow mountain), and towards Modlin and Baden a dark circle of hills, valleys, ruins of castles, antique churches, modern palaces, and handsome country-seats. The imperial palaces of Schönbrunn and Laxemburg are at a short distance from the city.

The climate is in general not so healthy as that of London or Paris: it is extremely variable, great heat being often suddenly followed by severe cold; yet, though an antient proverb says, 'Vienna aut ventosa aut venenosa,' this seems to be rather exaggerated. The islands and the parts of the city next the river are subject to inundations, and the atmosphere is frequently foggy. The number of deaths exceeds that of births; so that the gradual increase of the population, which now amounts to 360,000, including the garrison of 14,000 men, must be owing to the influx of strangers.

In 1840 the population was composed as follows:—

Natives of Vienna	204,298
Natives of the provinces . .	136,366
Foreigners	17,463
Total . .	358,127

The inhabitants of Vienna are a gay, friendly, and hospitable race of people, among whom a stranger quickly finds himself at home. Among the upper classes he finds none of the stiffness and reserve that he meets with in some other parts of Germany, and he is perhaps even more gratified and surprised by the comfortable, happy, and contented appearance of the lower orders. In the public walks and gardens they seem to have no thought beyond the enjoyment of the passing hour: it is in the Prater especially that the joyous and careless character of the Austrians, and their love of harmless amusement, has full scope for displaying itself. 'It is a pleasant sight,' says a late writer, 'to see family parties, in a fine afternoon, pitch their tents under the spreading trees, enjoy their humble feast; drink, laugh, and sing; while their children sport around them. No churlish police serjeant, with tyrannic cane, to warn them off the greensward; no portentous board, big with steel-traps and spring-guns, to scare them with its threats.' Beggars are not seen in the streets, and one may traverse them at all hours by day and by night without meeting with any kind of disturbance or annoyance; yet the public police is neither numerous nor intrusive. Breaches of the peace are rare, cases of drunkenness seldom occur, and gaming-houses are unknown. There is none of that open display of vice which disgraces London and Paris; and yet the whole number of the guardians of the peace, in the city and suburbs, does not exceed 700 men. Among the virtues of the Austrians, charity is preeminent; nor are they so devoted to pleasure as to neglect the cultivation of the mind: not only are their literary societies very numerous, but the higher classes in general are very accomplished. French, English, and Italian are spoken so currently as almost to supersede the German; and the ladies are extraordinary proficients in music, of which they are excessively fond.

There is a very vigilant and intelligent secret police at Vienna, the agents of which are often persons of good education, agreeable manners, and insinuating address: they have the appearance of gentlemen; they are connected with the waiters at the hotels and coffee-houses, by whom every step of the stranger is watched, his letters often opened, and all his concerns reported.

History.—Vienna, called by the Romans Vindobona, was long the head-quarters of a Roman legion, and the capital of Pannonia. When the Roman power declined it was successively overrun by the barbarian hordes of the Goths and Huns, till, in 791, Charlemagne annexed it to his dominions. It was then and long afterwards of small extent; St. Stephen's cathedral, now in the centre of the city, being, when erected in 1114, without the walls. It however increased progressively from the mercantile advantages of its situation, and by being the usual residence of the dukes and emperors. The most remarkable events in its annals are the various sieges which it has sustained. In 1484 it was taken by Mathias, king of Hungary, who resided in it till his death, when it was restored to Austria. In 1529 the Turks, assisted by the Hungarian insurgents, approached the city, and though they did not succeed in taking it, destroyed the suburbs. In 1619 the Bohemian insurgents, supported by a party in Austria, succeeded in penetrating into the city, but were almost immediately expelled, and hastily retreated to Bohemia. In [illegible] Torstenson, a Swedish general, with an army of Swedes and German Protestants, made an attempt on Vienna; the great alarm was felt; but Torstenson unexpectedly gave up his enterprise. In 1668 a new palace which the emperor Leopold had erected was destroyed by fire, a calamity which was attributed to the Jews, who were without exception expelled from the city and the province. In 1678 the plague broke out in Hungary, which gradually reached Vienna, when it carried off in the city [illegible] persons, and 73,323 out of the city. In 1683 the celebrated attack was made by a Turkish army, supported by some disaffected chiefs in Hungary, which reduced the city to extreme distress, and would probably have ended fatally for the city, and, in its consequences, for Christendom, had not the inhabitants held out in expectation of relief, which at length came, under John Sobiesky, king of Poland, who, with 60,000 men, totally defeated the Turkish army of nearly 200,000. In 1741 it was pressed by the Bavarians on the west and by the French and Prussians on the north, but they did not effect anything. In [illegible] it was threatened by Napoleon, and occupied by him in 1805 and 1809. Strict discipline was observed by the troops on both occasions.

(Joseph Freyherr v. Hormayer, *Wien, seine Geschichte und seine Denkwürdigheiten*, 9 bände; J. v. Hammer, *Geschichte des Osmanischen Reiches*, 10 vols. 8vo.; [illegible]menbach, *Gemälde der Oesterreichischen Monarchie*, 3 vols.; *Die Oesterreichische National Encyclopädie*, 6 vols. 1838; Brockhaus, *Conversations Lexicon*; Murray, *Handbook of Southern Germany*; Hassel; Stein; Hörschelmann; Cannabich; &c.)

VIENNA, TREATY OF. [TREATY.]

VIENNE, River. [LOIRE.]

VIENNE, a department of France, bounded on the north and north-east by the department of Indre et Loire, on the east by that of Indre, on the south-east by that of Haute Vienne, on the south by that of Charente, on the west by that of Deux Sèvres, and on the north-west by that of Maine et Loire. Its form is irregular: the greatest length is from north-north-west to south-south-east, from the junction of the three departments of Maine et Loire, Indre et Loire, and Vienne, to that of the three departments of Haute Vienne, Charente, and Vienne, 80 miles; the greatest breadth, at right angles to the length, is from the border of the department of Deux Sèvres, near [illegible], to that of the department of Indre, near La Trémouille, [illegible] miles. The area of the department is estimated at [illegible] square miles, which considerably exceeds the average area of the French departments, and is almost exactly equal to that of the English county of Lincoln (2611 square miles). The population, in 1826, was 267,670; in 1831, 282,731; and in 1836, 287,002, showing an increase in the last five years of 4271, or about 1·5 per cent., and giving nearly 110 inhabitants to a square mile. In amount of population it is far below the average population of the departments, and in density of population is just about two-thirds of the average; it falls considerably short in both respects of the English county with which we have compared it.

Poitiers, the capital, is on the Clain, in 46° 35′ N. lat. and 0° 20′ E. long.; 180 miles in a direct line south-west of Paris, or 213 miles by the road through Chartres, Vendôme, Tours, and Châtellerault.

The department has no mountains; the chain of hills, he heights of Gatine, which extends from the central mountains of Auvergne toward the mouth of the Loire crosses the south-western side of the department near the border in a north-western direction; and a branch from these hills extends towards the north-east, between the Clain and the Thoué, and occupies the northern part, except just at the northern extremity, where the hills subside into the valley of the Loire. The central part, between the Clain and the Vienne, consists of tolerably high ground; but the part east of the Vienne is low. The north-eastern border of the department is occupied by the cretaceous formations which surround the chalk basin of Paris; the rest of the department is occupied by the secondary rocks which intervene between the cretaceous and new red sandstone groups, except just towards the south-eastern border, where the lower secondary and primitive formations crop out. No coal is dug, and there were, in 1834, only three establishments for the manufacture of iron: in these were three furnaces for the production of pig-iron, and five forges for the manufacture of wrought-iron. Charcoal was the fuel employed. There are several quarries for millstones, whetstones, lithographic-stone, limestone, and freestone; and a quarry of marble which takes a good polish. There are mineral waters at La Roche-Posay, near the junction of the Creuse and the Gartempe: they are impregnated with sulphur.

The department belongs almost entirely to the basin of the Loire; a very small part in the south-west corner, about Civray, belongs to the basin of the Charente. The Vienne, which is one of the principal affluents of the Loire [Loire], enters this department on the south, just above Availles, and flows in a tolerably direct northward course through the department, which it quits below the junction of the Creuse. About 65 miles of the course of the Vienne are in this department or on the border; and about 17 miles, namely, from the junction of the Clain, are navigable. The official statement makes the navigation 22 miles. Nearly all the other rivers of the department are tributaries of the Vienne; the Grande Blourde, the Ozon (both small), and the Creuse join it on the right bank; and the Dive (small) and the Clain on the left bank: the Veude, which joins it on the left bank long after it quits this department, and the Mable, a feeder of the Veude, have their source amid the hills on the north of the department. The Creuse has the last 20 miles of its course (five of which are navigable) on the border of this department: its feeder the Gartempe rises in the department of Creuse, but has the lower part of its course, for nearly 40 miles, within or upon the border of this department. The Anglin, a feeder of the Gartempe, and the Sarleron and Benaise, feeders of the Anglin, belong partly to this department. The Clain rises in the department of Charente, but has nearly the whole of its course of more than 60 miles in this department. It receive the Cluere on the right; and the Pairou, the Dive, the Vonne, the Boivre, the Auzance, and the Palu on the left. None of the affluents of the Vienne are navigable, except the Creuse, and that for a very short distance; so that the department, though traversed by several considerable streams, has no other inland navigation than that of the Vienne 22 miles, the Creuse 5 miles, and the Dive 8 miles; in all only 35 miles. The Dive here noticed is not the small tributary of the Vienne or of the Clain mentioned above, but a tributary of the Thoué, an affluent of the Loire, which joins that river below the Vienne. The Dive rises in the department, and has the greater part of its course within or upon the western border. The Charente just crosses the south-western corner of the department.

There are no navigable canals. There were, on January 1, 1837, seven 'Routes Royales,' or government roads, having an aggregate length of 218 miles, namely, 178 miles in repair, 1 mile out of repair, and 39 miles unfinished. The principal road is that from Paris by Tours to Bordeaux, which enters this department on the north-east side, across the Creuse just above its junction with the Vienne, and runs by Châtellerault, Jaulnais, Poitiers, Vivonne, and Couhé-Verac. The road from Paris to Niort and Rochefort branches from this road beyond Poitiers, and runs by Lusignan. Roads run from Poitiers by Chauvigny and St. Savin to Châteauroux; by Lussac to Limoges; and by Mirebeau and Loudon to Saumur on the Loire. The departmental roads have an aggregate length of 146 miles, namely, 60 miles in repair, 14 miles out of repair, and 72 miles unfinished. The communal roads (which resemble our parish roads) have an aggregate length of 6000 miles.

The air is generally mild. The north wind prevails in winter, the north-west wind in spring, and the south wind in summer. The north-west wind is frequently injurious to vegetation, and to the health of the inhabitants, by the sudden transition which it occasions from heat to cold. The marshes which are found on the western side of the department are unhealthy.

The area of the department may be stated in round numbers at 1,680,000 acres, of which more than 1,000,000 acres are under the plough. The most productive soils are on the northern part of the department; those on the south and south-east are generally poor. The principal productions are wheat, rye, oats, hemp, flax, peas, and potatoes. The meadows occupy above 100,000 acres, and the heaths, or open pastures, nearly 190,000. A great number of horses, mules, horned cattle, sheep, goats, and pigs are bred: poultry is abundant. The vineyards occupy 70,000 acres: the wine is generally of ordinary quality; the best red wines are those of Champigny, Couture, Jaulnais, Dissais, Chauvigny, Villemort, Vaux, and St. Romain; and the white wines of Loudon and Trois Moutiers. Some wine and brandy are sent to the surrounding departments or are exported. The orchards occupy 14,000 acres, the woods 200,000. A considerable quantity of walnuts and chestnuts are grown; the latter furnish the peasantry with an important article of food.

The department is divided into five arrondissements, as follows:—

Arrondissement.	Situation.	Area in Square Miles.	Communes.	Cantons.	Population. 1831.	1836.
Poitiers	Central & W.	760	82	10	94,770	95,939
Châtellerault . .	N.E.	422	50	6	50,413	52,877
Civray	S.W.	456	45	5	44,442	45,795
Loudon, or Loudun	N.W.	342	63	4	35,103	35,240
Montmorillon . .	S.E.	637	60	6	58 003	57,151
		2617	300	31	282,731	287,002

In the arrondissement of Poitiers are—Poitiers, population of the commune in 1826, 21,563; in 1831, 23,128; and in 1836, 22,000 [Poitiers], on the Clain; Vivonne and Jaulnais, on the same river; Sanxay, or Sanzay, and Lusignan, on the Vonne; Latillé, on the Auzance; Neuville, between the Auzance and the Palu; and Mirebeau (population 1781 for the town, or 2405 for the whole commune), on a feeder of the Dive, which flows into the Thoué. Vivonne has a manufacture of coarse woollens and some dye-houses. It has a 'halle,' or market-house: there are twelve yearly fairs. Jaulnais has four yearly fairs for wool and cattle. Lusignan has a manufacture of coarse woollens; excellen macaroons are made here, and considerable trade is carried on in grain, and trefoil and lucern seed: there ar nine yearly fairs. There was formerly a strong castle a Lusignan, which sustained a number of attacks very destructive to the assailants. It was however taken, an razed by the duke of Montpensier (A.D. 1574) in the religious wars of the sixteenth century: the site is at presen occupied by a pleasant public walk, which commands a agreeable prospect. The house of Lusignan acquired th crowns of Jerusalem and Cyprus. Mirebeau was built b Foulques Nera, count of Anjou, who also erected a castl here. In this castle Eléonore of Guienne, widow Henry II. of England, was besieged (A.D. 1202) by he grandson, Arthur, duke of Bretagne, but was relieved b the approach of her son, King John of England, who too Arthur prisoner, and afterwards murdered him. Mirebea has trade in corn, wine, sheep, and wool. It gave title t the district of Mirebelais, of which it was the capital. Th village of Vouillé, on the Auzance below Latillé, was th scene of the great battle (A.D. 507) in which Clovis th Frank defeated and slew Alaric II., king of the Visigoths a victory which was followed by the conquest of nearly a the territories of the Visigoths in Gaul.

In the arrondissement of Châtellerault are—Châtellerault population in 1826, 9241; in 1831, 9437; and in 183 9695 [Chatellerault], on the Vienne; Lencloitre, on small feeder which joins the Vienne at Châtellerault; L Roche Posay, on the Creuse, at the junction of the Gartempe; and Pleumartin, in the country between the Gartempe and the Vienne. La Roche Posay, or Pozay, is very small place, but has baths and mineral-waters, which are recommended in cases of fever. There are twelve yearly fairs. The village of Les Ormes, near the junction of the Creuse and the Vienne, has a splendid mansion and park of the family of D'Argenson.

In the arrondissement of Civray are—Civray, on the Charente, population in 1826, 2192; in 1831, 2203 (of whom 1900 were in the town itself); and in 1836, 2100; Charroux, on or near the Charente; Availles, on the Vienne; Usson and Gençay, on the Cluere; and Couhé-Verac, on the Dive, which flows into the Clain. Civray has a church of great antiquity, and the ruins of an antient castle. There are a subordinate court of justice, an agricultural society, and a communal high school. Trade is carried on in corn, chestnuts, and truffles. Availles has some chalybeate waters in the neighbourhood, but they are of little repute. Gençay has a coarse woollen manufacture, and fifteen yearly fairs for wool and cattle.

In the arrondissement of Loudon are—Loudon, population in 1826, 5044; in 1831, 5078 (of whom 4639 were in the town itself); and in 1836, 5032, on the road from Poitiers to Saumur; Moncontour, on a feeder of the Dive, which joins the Thoué; and Monts, in the country between the Dive and the Mable. Loudon, or Loudun, is an antient town, situated on a hill, and surrounded by vineyards which produce some of the best wine in the department: it has some pleasant public walks, a theatre, and an hospital. There was formerly a castle, but it is now destroyed. Coarse woollens and lace are manufactured; and considerable trade is carried on in corn, wine, brandy, walnuts, and oil: there are seven yearly fairs. There are several government offices, a subordinate court of justice, an agricultural society, and a communal high school. Loudun was formerly the chief town of the district of Loudunais; and was erected into a duchy. It was, during the sixteenth and early part of the seventeenth centuries, chiefly occupied by Protestants, and suffered much from the revocation of the Edict of Nantes. Moncontour is chiefly known by the defeat sustained here (A.D. 1569) by the Huguenots, under Admiral Coligni.

In the arrondissement of Montmorillon are—Montmorillon, population in 1836, 3539; in 1831, 3608 (of whom 3096 were in the town itself); and in 1836, 4157, on the Gartempe; Saint-Savin, also on the Gartempe; Angle, on the Anglin; La Trémouille, on the Benaise; and L'Ile-Jourdain, Lussac, distinguished as Lussac-les-Châteaux, and Chauvigny, on the Vienne. Montmorillon is an ill-built town: it has a curious monument, supposed to be Druidical, an ecclesiastical school, a subordinate court of justice, several government fiscal offices, and an hospital. Biscuits and highly esteemed macaroons are made; and there are paper-mills, bleach-grounds for linen, and tan-yards. Considerable trade is carried on in cattle fattened in the neighbourhood for the Paris markets. There are twelve yearly fairs. St. Savin has a considerable trade in sheep. L'Ile-Jourdain has a monthly fair for cattle and provisions. Chauvigny has twelve yearly fairs; drugget and serge and leather are manufactured in the town, and some tolerably good wine is grown in the neighbourhood.

The population, when not otherwise described, is that of the commune, and is taken from the census of 1831.

This department and the adjacent one of Deux Sèvres constitute the diocese of Poitiers, the bishop of which is a suffragan of the archbishop of Bordeaux. It is in the jurisdiction of the Cour Royale of Poitiers, and the direction of the Académie Universitaire of the same city. It is included in the twelfth military division, of which the head-quarters are at Nantes; and sends five members to the Chamber of Deputies. In respect of education it is considerably below the average of France: of the young men enrolled in the military census of 1828-29, only 25 in every hundred could read and write, while the average of France at the time was between 39 and 40.

In the most antient historic period, this department formed part of the territories of the Pictones (Πίκτονες), or, as they were afterwards called, Pictavi, a Celtic nation. In the division of Gaul by Augustus, the territory of this people was included in the province of Aquitania, and upon the subdivision of that province, in Aquitania Secunda. The town of Limonum, afterwards called, from the name of the people, Pictavi (now Poitiers), and the position Fines of the Antonine Itinerary between Argentomagus (Argenton) and Limonum, were in the limits of this department. This territory was on the downfall of the Roman empire included in the kingdom of the Visigoths, but was taken from them by the Franks. In the middle ages it formed part of the county of Poitou. [POITOU.]

(Malte-Brun, *Géographie Universelle*; *Dictionnaire Géographique Universel*; Vaysse de Villiers, *Itinéraire Descriptif de la France*.)

VIENNE, HAUTE, a department of France, bounded on the north by the department of Indre, on the east by that of Creuse, on the south-east by that of Corrèze, on the south-west by that of Dordogne, on the west by that of Charente, and on the north-west by that of Vienne. Its form is irregular, approximating however to a quadrangle, having its greatest length from north-north-west to south-south-east, from the junction of the three departments of Vienne, Indre, and Haute Vienne, to the border of the department of Corrèze between Eymoutiers and Chamberet, 60 miles; and its greatest breadth at right angles to the length, from the border of the department of Creuse, between St. Léonard and Bourganeuf, to the junction of the three departments of Dordogne, Charente, and Haute Vienne, 50 miles.

The area of the department is estimated at 2146 square miles, which is rather under the average area of the French departments, and rather greater than the English county of Norfolk. The population, in 1826, was 276,351; in 1831, 285,130; and in 1836, 293,011; showing in the last five years an increase of 7881, or nearly 2·8 per cent., and giving 136 or 137 inhabitants to a square mile. In amount and density of population the department is considerably below the average of the French departments; and very far below the English county with which we have compared it. Limoges, its capital, is 214 miles in a direct line south-south-west of Paris, or 236 miles by the road through Orléans, Vierzon, and Châteauroux; in 45° 50′ N. lat. and 1° 15′ E. long.

The heights of Gatine, which extend from the great central mountain-group of Auvergne toward the mouth of the Loire, and separate the basin of that river from the basins of the Garonne and the Charente, cross the southern part of this department in a direction nearly from east to west. Mount Jargeau, the most elevated point on the chain of hills, is estimated at 3114 feet. Another chain nearly parallel to these, crosses the centre of the department, separating the valley of the Vienne from that of its feeder the Gartempe. The most elevated point in the chain is Le Puy le Vieux, 3196 feet high. The mountains have generally round tops, few if any steep or craggy summits appear; so that they do not present the grand and imposing appearance of the Auvergnat group, though they occasionally afford picturesque scenery. The whole department is occupied by the primitive or lower secondary formations, especially by granite. No coal is dug, but there were, in 1834, in the department, almost entirely in the southern part, twenty-six iron-works, with nine furnaces for producing pig-iron, and forty-eight forges, of which thirty-nine were for producing wrought-iron and nine for steel. Charcoal was the chief or only fuel employed. Porcelain-clay is obtained from pits in the south of the department, and granular felspar, which is used for glazing the porcelain. Good granite and other building-stone and limestone are dug.

The department is chiefly included in the basin of the Loire: the southern slopes of the heights of Gatine belong to the basins of the Charente and the Garonne. On these slopes the Tardoire and the Bandiat, which unite and flow into the Charente; and the Dronne, the Isle, and the Loue, which belong to the system of the Garonne, rise; but only a small portion of the upper course of these rivers belongs to this department. Of the tributaries of the Loire, the Vienne is the only one belonging to this department, which it enters on the east side, a few miles from its source (in the department of Corrèze) and crosses from east to west into the department of Charente; passing Eymoutiers, St. Léonard, Limoges, Aixe, and St. Junien. It receives, on the right bank, the Maude, the Thorion or Taurion, the Glane, and the Issoire; and on the left bank, the Combad or Combade, the Briance (formed by the junction of the Grande Briance and the Petite Briance), the Aixette, the Gorre, and the Vaire. These feeders are all small. The Vaire and the Issoire join the Vienne beyond the limits of the department. The Gartempe, a feeder of the Creuse (which joins the Vienne long after it leaves this department), drains the northern part: it receives the Seine and the Bram on the right; and he Ardour, the Couze, and the Vincou (which receives the layeule) on the left. The Benaise and the Sarleron, eeders of the Anglin (an affluent of the Gartempe not beonging to this department), rise within the northern order. Ponds are numerous, but none of them large.

The department is entirely destitute of water communicaion: none of the above rivers are navigable, and there are o navigable canals.

The number of 'routes royales,' or government roads, on he 1st of January, 1837, was seven, having an aggregate ength of 236 miles, namely, 132 miles in repair, 58 miles ut of repair, and 46 miles unfinished. The principal road s that from Paris to Bordeaux by Orléans, Châteauroux, imoges, and Perigueux. This enters the department on ne north-east side, and runs south by west through imoges, Aixe, and Chalus, into the department of Dorogne. The road from Paris to Toulouse branches from his at Limoges, and runs south-south-east by Pierre-Bufère into the department of Corrèze. Roads from Limoges in westward by St. Junien to Angoulême, north-westward y Bellac to Poitiers, and eastward by St. Léonard to ubusson (in the department of Creuse) and Clermonterrand. A road from Dorat, in the northern part of the epartment, runs eastward to Guéret, in the adjoining deartment of Creuse. The departmental roads had at the ame time an aggregate length of 177 miles, namely, 79 good repair, 29 out of repair, and 69 unfinished. The cinal roads (corresponding to our parish roads) had a ngth of above 4200 miles.

From the general elevation of the soil and the ranges of ountains traversing the department, the air is colder than e latitude would lead us to expect. The average temerature of Limoges is less than that of Paris, though it is tuated full three degrees more to the southward. The rnosphere is moist and the temperature changeable.

The area of the department may be estimated in round umbers at 1,370,000 acres; of which about 503,000 acres r less than two-fifths) are under the plough: but of this ly a small portion is calculated for wheat. A considerble quantity of rye and buckwheat is grown; the growth corn is however insufficient for the support of the inabitants, but the deficiency is made up by the abundance f chestnuts. The meadows are very extensive, amounting the aggregate to above 320,000 acres, besides 230,000 res of heath, common, or other open pastnre, and grazg forms the most important branch of agricultural inistry. The hay is excellent, but the artificial grasses are arcely known. A great number of mules, horses of the mousin breed, which are among the most excellent and ost esteemed in France, and of horned cattle, are reared. orse-races and a cattle-show are held yearly at Limoges, d prizes are distributed. Pigs are numerous. The neyards occupy only about 7000 to 8000 acres, and proce only ordinary red wine: the orchards and gardens cupy about 9000 acres. The woodlands occupy above ,000 acres, chiefly in small clumps or in copses: chestts and walnuts are grown in great abundance, and there a considerable quantity of oak timber. Game is plenul. A great number of bees are kept.

The department is divided into four arrondissements, as llows:—

ondissement	Situation.	Area in Square Miles.	Communes.	Cantons.	Population. 1831.	Population. 1836.
noges	Central and E.	779	78	10	113,483	120,476
lac	N.	701	65	9	80,061	81,457
chechouart	W.	314	29	not given.	47,793	48,818
Yrieix	S.	352	26	4	41,783	42,260
		2146	198		283,130	293,011

later statement of the number of cantons or districts, h under a justice of the peace, makes them amount to for the whole department.

In the arrondissement of Limoges are—Limoges (popuion, in 1826, 25,612; in 1831, 27,070, of whom 23,804 re in the town itself; and in 1836, 29,706) [LIMOGES], the Vienne; Aixe, St. Léonard (pop. 3299 for the town, 5705 for the whole commune), and Eymoutiers (pop. 6), on the same river; Pierre-Buffière and Salagnac on Briance; St. Paul, between the Briance and the nne; Châteauneuf, on the Combade, and Peyrat, on Maude. Aixe has some Roman remains and the ruins castle of the middle ages. St. Léonard is on an eminence on the right bank of the Vienne, over which there is a handsome bridge. It is a tolerably well-built town, and its 'boulevards' command a pleasant prospect. The church is of very great antiquity. There are paper-mills and copper-works, and the townsmen manufacture woollen stuffs, common hats, porcelain, and sheepskin and other leather. There is a monthly fair, and considerable trade is carried on. At Eymoutiers (or Aimoutier), which is on the left bank of the Vienne, in a mountainous district, there are tan-yards, and cotton-yarn is manufactured; there is a monthly fair. Pierre-Buffière has a handstone stone bridge over the Briance, on the left bank of which it is situated. It has the remains of an old castle, part of which is occupied as the town-house. Cotton-yarn and leather are manufactured, and there are twelve yearly fairs. Peyrat is pleasantly situated; it was antiently a place of some strength; it has now twelve yearly fairs.

In the arrondissement of Bellac are—Bellac (population in 1826, 3400; in 1831, 3607, of whom 3025 were in the town itself; and in 1836, 3581) [BELLAC], near the Vincou; Laurière, between the Couze and the Ardour; Château-Ponsat (pop. 3742), on the Gartempe; Magnac-Laval (pop. 3455), and Le Dorat (pop. 1805 for the town, or 2237 for the whole commune), near the Bram; and Lussac-les-Eglises, near the Benaise. Paper is made at Laurière: there are four yearly fairs. Some antient inscriptions have been dug up at Château-Ponsat. At Magnac-Laval woollen cloths and paper are manufactured. A weekly fair is held during the interval between the middle of December and the Carnival. Le Dorat is a good town; the inhabitants manufacture woollen cloth and cotton goods, barometers, and weights and measures. There is a monthly fair for cattle, horses, mules, poultry, flax, hemp, and linen. Lussac-les-Eglises has a yearly fair for fat cattle. At Danac, a village of about 2000 inhabitants, not far from Le Dorat, is a large glasshouse for making bottles, and an earthenware manufactory.

In the arrondissement of Rochechouart are—Rochechouart (population in 1826, 1550; in 1831, 3996, of whom 1571 were in the town itself; and in 1836, 4123), on the Vaire; and St. Junien (pop. 3495 for the town, or 5895 for the whole commune), on the Vienne. Rochechouart has the remains of an antient castle on the crest of a precipitous rock, at the foot of which the town stands. The castle was besieged without success by the English in the wars of Edward III. The town has a subordinate court of justice and one or two fiscal government offices. St. Junien is built on the slope of a hill at the junction of the Glane with the Vienne, on the right bank of the latter. The town is surrounded by boulevards, which are planted with trees and command a pleasant prospect of the surrounding country: it is an old town, and is one of the busiest places in the department. The only building deserving notice is the parish church. The townsmen manufacture gloves, which are in high repute, blankets and cotton coverlets, hats, woollen cloths, serge, porcelain and common earthenware, chamois and other leather, and paper. There are bleach-houses for wax and dye-houses. Considerable trade is carried on in horses, mules, cattle, hides, corn, hemp, flax, and wine, especially at the fairs, which are held monthly.

In the arrondissement of St. Yrieix are—St. Yrieix (population in 1826, 2746; in 1831, 6542, of whom 2832 were in the town itself; and in 1836, 6900), on the Loue; Chalus on the Tardoire; and St. Germain-les-Belles Filles, between the Grande Briance and the Petite Briance. St. Yrieix is an ill-built town; it has five parish churches, one of which, a collegiate church, is considered an admirable specimen of Gothic architecture. The townsmen manufacture porcelain and common earthenware, woollen cloths and coarse woollen stuffs, and leather. There are some iron-works. The materials for making and glazing the porcelain are dug close to the town. Trade is carried on in hempen thread and porcelain clay. There are a subordinate court of justice, some fiscal government offices, and an agricultural society. St. Yrieix sustained a long siege during the war of the League. Chalus has some historical interest as being the place where Richard I. (Cœur-de-Lion) of England received his death-wound, A.D. 1199. It is divided by the Tardoire into the upper and the lower town: the upper town, formerly distinguished by the name of Chalus-Chabrol, was defended by a strong fort or tower; another tower defended the lower town. Chalus has several yearly fairs, one of which is a great horse and mule fair. St. Germain-les-Belles Filles has several yearly fairs for corn and cattle.

The population, when not otherwise described, is that of the commune, and from the census of 1831.

This department and the adjoining department of Creuse constitute the diocese of Limoges, the bishop of which is a suffragan of the archbishop of Bourges. It is in the jurisdiction of the Cour Royale of Limoges and in the district of the Académie Universitaire of the same city. It is comprehended in the fifteenth military division, of which the head-quarters are at Bourges. It returns five members to the Chamber of Deputies. In respect of education it is one of the most backward of the French departments, being surpassed by all except the departments of Cher, Allier, and Corrèze. Of every hundred young men enrolled in the military census of 1828-29 only thirteen could read and write; the average of the departments being above thirty-nine in every hundred.

In the most antient historic period this part of France belonged to the Lemovices (*Λεμόβικες*, Strabo), or Limovici (*Λιμουίκοι*, Ptolemy), or Lomovici (*Λομουίκοι*), a Celtic nation: the form Lemovices is that used by the best Latin authorities. Some portions of the north-western border of the department were in the territory of the Pictones. In the Roman division of Gaul the country of the Lemovices and the Pictones was included in the province of Aquitaine; and upon its subdivision, that of the Lemovices in Aquitania Prima, and that of the Pictones in Aquitania Secunda. Augustoritum, the capital of the Lemovices, called from them, in the later period of the Roman dominion, Lemovices, is the present Limoges. On the downfall of the Roman empire, this department was subject first to the Visigoths, afterwards to the Franks. In the middle ages it was chiefly included in the province of Limousin or Limosin; but some parts of the north and east were included in the province of La Marche; and a small portion on the west side in the province of Poitou. [MARCHE, LA; LIMOUSIN; POITOU.]

(Malte-Brun, *Géographie;* Vaysse de Villiers, *Itinéraire Descriptif; Dictionnaire Géographique Universel.*)

VIENNE, a town in France, capital of an arrondissement in the department of Isère, 258 miles in a direct line south-south-west of Paris, or 302 miles by the road through Sens, Auxerre, Autun, Châlons-sur-Saône, and Lyon; in 45° 32′ N. lat. and 4° 54′ E. long.

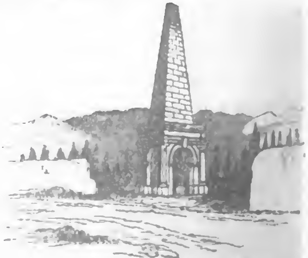
Vienne is a place of great antiquity, and retains many monuments of its former splendour; but the antient town was considerably larger than the modern one. A Roman structure of pyramidical form, a quarter or half a mile out of the southern gate of the town, appears from tradition, and from traces of the antient ramparts, to have been once in the middle of the town, which is said to have been three miles in circuit. The modern town is on the left or east bank of the Rhône, just at the junction of the Gère, a little river which flows through Vienne. The town occupies the bottom and sides of the narrow valley through which this river flows, and extends to the bank of the Rhône, over which there is a bridge uniting Vienne with the village of Sainte-Colombe. The town is ill-laid out, and the streets are narrow, crooked, dark, and dirty; but there is a handsome quay on the Rhône, and many new buildings have been erected of late years. The cathedral of St. Maurice is a very fine building, though it suffered much injury during the religious wars of the sixteenth century and during the Revolution: the church of the abbey of St. Pierre, though much defaced, has some curious sculptures and inscriptions of the middle ages: the other buildings of the abbey have been destroyed. The town-hall has a handsome modern front, and there are fine cavalry barracks. Among the Roman monuments is a temple of the Corinthian order, somewhat resembling the 'Maison Carrée' of Nîmes, but not so elegant: it was converted in the eleventh century into a church, and is now used as a museum. There are the remains of an amphitheatre and of a theatre, an arch or gateway, in the best style of Roman workmanship, some portions of an aqueduct, and a number of bas-reliefs and inscriptions. Fort Pipet is a square tower, partly Roman, partly of the middle ages. Fort Salomon is wholly of the middle ages. There are at Vienne a modern theatre, a college, a public library of 12,000 volumes, a museum of antiquities, and gallery of paintings.

The population of the commune of Vienne was, in 1826, 13,780; in 1831, 14.079 (of whom 13,410 were in the town itself); and in 1836, 16,484. There are several manufactories on the Gère, the waters of which never freeze. There are tan-yards, paper and copper mills, and iron-works; and woollen cloth and other woollens, sail-cloth, &c. are manufactured. There is a small lead-mine near the town.

Vienne, or, as the Romans called it, Vienna, was in existence in the time of Cæsar, who mentions it in his Commentaries. It was the chief town of the Allobroges, and some persons (of what nation does not appear) whom the Allobroges expelled from the town were the first inhabitants of Lugdunum, or Lyon. (Dion Cassius, lib. xlvi.) Vienna is mentioned by Ptolemy, who writes the name *Οὐίεννα*, which is also the orthography of Strabo, as one of the chief towns of Gallia Narbonensis; and when that province was subdivided, it gave name to the subdivision Viennensis, in which it was included. In the Peutinger Table the name is written Vigenna, but this is no doubt an error. The townsmen appear to have been great admirers of the epigrams of Martial, which may be taken as an indication that literature was cultivated among them. That poet mentions the circumstance in some of his lines (lib. vii., Epigr. lxxxviii.). In another epigram (lib. xiii., Ep. 107) Martial gives to Vienna the epithet 'vitifera' (vine-bearing): the vineyards on the Rhône immediately opposite still produce the Côte Rôtie, one of the finest of the French red wines, and the hills round Vienne, on both sides of the river, are covered with vineyards, which produce abundance of good red wine.

Vienna was a Roman colony, and the rival of its neighbour Lugdunum. In the civil war at the close of Nero's reign it embraced the party of Galba, from whom it received many honours; while Lugdunum embraced the cause of Nero. Lugdunum was besieged by the people of Vienna, but without success; and in revenge, the people of Lugdunum sought to induce the army of Valens (one of Vitellius's generals) to destroy Vienna; but the soldiers resisted the persuasion. (Tacitus, *Histor.*, lib. i., c. lxv., lxvi.) Archelaus, the son of Herod the Great, when deprived of the kingdom of Judæa, was sent into exile at Vienna (A.D. 6 or 7), as his brother Antipas afterwards was (A.D. 39) at Lugdunum. (Josephus, *Antiq.*, xvii. 13; *War*, ii. xi.) Tradition fixes Vienna as the place of Pilate's banishment after he had been displaced from the government of Judæa, and the Roman structure below is popularly called the tomb of Pontius Pilate. It was at Vienna that the emperor Valentinian II. was killed (A.D. 392) by Arbogastes the Frank. A Christian church was early established here; the bishopric dates from the third century, and the bishop disputed the dignity of metropolitan of Narbonensis with the bishop of Arles. The see was subsequently raised to the rank of an archbishopric, and had for its suffragans (before the Revolution) those of Die, Annecy, Grenoble, Maurienne, Valence, and Viviers. It is now united to the archbishopric of Lyon. [LYON.] Several Councils have been held at Vienne: the most celebrated is that of 1311, at which the order of the Templars was abolished.

The arrondissement of Vienne has an area of 641 square miles, and comprehends 132 communes: the population, in 1831, was 138,474; in 1836, 145,001.



Monument at Vienne, called the Tomb of Pontius Pilate.
Drawn by W. B. Clarke, Oct., 1838.

(Millin, *Voyage dans les Départemens du Midi de la France;* Vaysse de Villiers, *Itinéraire Descriptif de la France;* Malte-Brun, *Géographie Universelle; Dictionnaire Géographique Universel.*)

VIERZON, a town in France, in the department of Cher, 111 miles in a direct line south or south by west of Paris, or 125 miles by the road through Orléans; in 47° 13′ N. lat. and 2° 3′ E. long. The town stands on the right bank of the Evre, just above its junction with the Cher, in a fertile plain. It is well-built; the houses are chiefly covered with slate. There are limestone-quarries and pipeclay and ochre pits in the neighbourhood; the ochre s considered the best in France. There are in the town ron and steel works, a porcelain manufactory and one for common earthenware, tan-yards, paper-mills, and manufactories for serge and woollen cloth. Trade is carried on n timber and wool: there are five yearly fairs, one of which is an important wool-fair. The population, including the adjacent village of Vierzon, which forms a separate commune, was, in 1831, 7967, of whom 4706 were n the town. There is an hospice or almshouse. (Malte-Brun, *Géographie; Dictionnaire Géographique Universel.*)

VIETA, FRANCIS. Much has been said of the writings of Vieta, but very little on his life, and that little has often been wrongly given. In the absence of all good sources of reference, we are under the necessity of giving somewhat more space to this biography than is usual. We also intend to insert in this article some account of Lucas Pacioli, which has been omitted in its proper place, and some additional details on Leonard of Pisa.

François Viet, Viette, or de Viette* (his name is given n these ways, and in one of his own writings it is Latinized Fr. Vietæus, but more usually Vieta), was born at Fontenai-e-Comte, a small town not far from La Rochelle, in the ear 1540. His family, if we may judge from the position which he occupied during the greater part f his life, must have had both rank and interest. We may connect the epoch of his birth with other parts of he history of science, by stating that he was born about the time when algebra was introduced into the northern parts of Europe from Italy, in the 39th year of the age of Cardan, and three years before the death f Copernicus: while Napier, Harriot, and Galileo were espectively 10, 20, and 24 years his juniors. Of his ducation and early years we know nothing, and the scanty materials for the rest of his life are found princially in the work† of his friend the president De Thou *Hist.*, lib. CXXIX.). Bayle charges this celebrated writer *Dict.*, art. 'Rasario') with inaccuracy in his accounts of arned men: if we may disregard this imputation in the ase of Vieta, with whom the biographer was personally nd intimately acquainted, we cannot all the more help wishing that the facts preserved had been more in number, nd of somewhat closer connexion with the scientific puruits of Vieta. The whole of De Thou's account does not mount to more than a few insulated anecdotes, which are ften repeated; and the want of information from other quarters respecting one of the greatest mathematicians of the sixteenth century may be accounted for if we remember the troubled times in which he lived, and the rule which he appears to have followed of printing all his works at his own expense, and distributing them as presents among his friends. This has been found almost uniformly to be a successful mode of preventing or diminishing posthumous fame.

The life of Vieta was passed in the public service: on the esignation of De Thou, he was made master of requests. We have seen it said that he held this office under Henry III., and elsewhere that it was in the household of Margaret, wife of Henry IV. Both statements are probably true, since De Thou assures us that his attention to the mathematics was only the relaxation of a whole life spent in public business, for which, says the historian, he had both talent and industry. And Vieta himself, in his answer to Adrian Romanus, says that he cannot profess to be a mathematician, but only a person to whom mathematical studies are delightful when he has leisure.* He lived and held office through the religious troubles of the reigns of Henry III. and Henry IV.: a letter of his friend Ghetaldi, hereinafter mentioned, proves that he was on the council of state in the latter reign, and we must suppose that his love of study induced him to confine himself to the simple duties of his calling. It seems however that he did not entirely escape the dangers of the time, or the attacks of the opposite party. In his dedication to Catherine de Parthenai, Duchesse de Rohan, and mother of the Duc de Rohan, well known as the leader of the French Protestants in the time of Louis XIII., he addresses that lady as one who had saved him from imprisonment and certain death: which means, we suppose, that he had fallen into the hands of the Huguenots. He proceeds to aver, but whether this be fact or dedication we have no means of knowing, that it was her love for and great skill in mathematics which first incited him to that study. Her literary attainments are mentioned by her biographers, and the account given by Vieta may be perfectly true. There is only one story in De Thou of his political services:—The extent and scattered character of the Spanish dominions having rendered their communications insecure in time of war, a cipher was invented with more than 500 characters, and these not permanently retaining the same signification. The complexity of this method foiled the ordinary decipherers, and application was thereupon made to Vieta, who without any difficulty discovered the secret, which was used for more than two years, to the great loss and annoyance of the Spaniards. These, perceiving that their cipher was detected, and imagining that no human skill was equal to such an effort, attributed the discovery to magic, and took care to publish this report throughout Europe, but particularly at the court of Rome. But the imputation failed to excite any odium, and was received, says De Thou, *non sine risu et indignatione rectius sententium:* heresy had taken the place of sorcery. It is therefore not true, though some writers have said it by way of mending the story, that Vieta was actually cited to appear at Rome and answer the charge of dealing with the foul fiend.

Indirectly connected with the politics of the day is the share which Vieta took in the controversy on the reformation of the calendar. This, as is well known, was completed under the auspices of Pope Gregory XIII., in 1582, though the subject had been in agitation more than a century, and the change had even been projected by Sextus IV., in 1474. The plan finally adopted was that of Lilius,† an astronomer of Calabria, who died before its presentation to the pope, and the execution of it was intrusted to the Jesuit CLAVIUS. It is to be remembered that the true time of keeping Easter was then thought of the utmost importance, and that heterodoxy in this particular had more than once been thought worthy of excommunication. The reformed calendar was attacked by Vieta, Joseph Scaliger, and others, the first of whom published in the year 1600 what he called the true Gregorian calendar, and prefixed to it the bull of Gregory XIII. On this work it will be sufficient to say that Montucla and Delambre unite in condemning the ideas of Vieta: he made 3400 Julian years contain exactly 42,053 lunations, the error of which is a trifle more than that of the astronomy of his day. His work was carried by himself to Cardinal Aldobrandini, who was then at Leyden on a mission from Clement VIII. He had however no success with the cardinal, 'as I warned him when he set out,' says De Thou, 'feeling sure that an improvement adopted by the princes of Christendom after so much deliberation, would not easily be modified, even for the better, by those who think it a secret of government never to confess that they either have erred or can err.' Clavius simply replied to Vieta by referring him to a work on the Gregorian calendar which he was then preparing, and which he stated would contain a full reply to all the objections. This answer seems to have enraged Vieta beyond his powers of forbearance. Perhaps he felt indignant at not being considered worthy of a separate reply, or perhaps the malady which afterwards list we have placed R. M. before the titles of the following descriptions, in every case in which the 'Restituta Mathematica' is said to have contained the work. Besides these, we must reckon among the contents the seven first books of the *Responsa*, which have not come down to us, though tradition has preserved the name; and 'Ad logisticen speciosam notæ posteriores,' of which even the very name has disappeared from the history of algebra. We cannot help hoping that some old library may yet be found to contain this collection. Other writers take the words of the title in a sense between that of quotation and description. Thus Alexander Anderson says, '*Restitutam Mathematicam Analysin* F. Vietæ debetis, φιλομαθεῖς.' And Walter Warner (preface to Harriot), '*Artis Analyticæ Restitutionem* F. Vieta aggressus est.']

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* Albert Girard, at the beginning of the seventeenth century, and De L'Hopital at the end, both call him *Viette.*

† We have examined what Teissier has added in his collection of De Thou's biographies, and find nothing particular except the assertion that letters from Vieta are found in the collection of Caselius, which is totally inaccurate.

* His great contemporary Napier made a profession of the same sort. The interpretation of the Revelations and the overthrow of the Pope were his occupations; the mathematics, his relaxation.

† Libri corrects a mistake very often made, namely, the statement that Lilio was of Verona, and also the confusion between him and *Giglio* Gregorio Giraldi, frequently called *Lilio*, a learned writer, who published a work on the ancient calendar, but who died about 1552, long before the Gregorian reformation.

We believe it will be shorter and clearer to leave the preceding passage in brackets (for which we thought we had very fair evidence), and to make a suspected correction, as another writer would do; in preference to mixing up the mistake (if it be a mistake) and the correction. The first publication of the 'Isagoge,' &c. (1591) bears on its title-page that it is 'Seorsim excussa ab *Opere* Restitutæ Mathematicæ Analyseos, seu Algebræ Novæ:' and on the reverse of the title-page appears 'Opere Restitutæ Mathematicæ Analyseos, seu Algebrâ Novâ, continentur . . . . : *Operi* autem Preposita *est* sequens epistola.' Ten works are given by title, which may, all but the *seven books* and the *notæ posteriores* already noticed, be collected from the indication (R. M.) in the following list; and the epistle is the dedication to Catherine of Parthenai before alluded to. Blancanus (1615) places 'Opus Restitutæ,' &c. in the list of Vieta's works; and Morhof says that Vieta wrote 'Isagoge, &c. *seu Algebra Nova*.' Can any evidence be more positive to the fact that a work was published, or at least written out for publication? The absence of date or printer's name tells nothing as to that period, for books were then few, and did not require the minute accuracy of description which is now necessary to distinguish one work from another: moreover, whether this be the reason or not, such accuracy of description was not usual. Why then do we not continue to believe that such a work was published? In the first place it is entirely lost, and with it the *Responsa* and the *notæ posteriores*, which is not likely to have happened to a large collection of Vieta's works: in the second place, Anderson, in his publication (which he gives us to understand was the first that was made) of the treatise 'De Recognitione,' &c., tells us something about Vieta's habits, which seems to explain the whole. 'He was,' says Anderson, 'in the habit of [referring to as finished' (*insignire* solebat) and by their names, works which, though undertaken in his own mind, and digested in order, were not even so much as fairly written down, owing to the interruption which his studies received from his public duties. This, then, may be the whole secret: Vieta gave a list of the works which he intended to publish, under the name which he intended to give them collectively. The seven books of the *Responsa* and the *notæ posteriores* never, on this supposition, were published at all. And it will afterwards appear that there was a reason why the eighth book of the *Responsa* should have been published without the rest; though it is singular, if the list above named be only of works intended, that this eighth book, which must have been as finished as the rest, should not have been mentioned. It is almost incredible, moreover, that Alexander Anderson should have published a few of Vieta's theorems, with his own demonstrations, as new, if Vieta had published them, and more, twenty years before.

(R. M.) *In Artem Analyticam Isagoge*, first published by Vieta himself, at Tours, in 1591. Here are laid down the principles of homogeneity before alluded to, and the common axioms used in the solution of simple equations. Many new terms are introduced, of which only two have lasted, namely, the distinction of equations into *pure* and *adfected*. The law of homogeneity is a fanciful deduction from certain well-known analogies between arithmetic and geometry, and the manner in which it is applied renders this book of Vieta somewhat obscure. The following is a specimen: 'Lineam rectam curvæ non comparat (probably corrupt, *comparare non licet*), quia angulus est medium quiddam inter lineam rectam et planam figuram. Repugnare itaque videtur homogeneorum lex.'

(R. M.) *Ad logisticen speciosam notæ priores*. The *notæ posteriores*, as just mentioned, are lost. *Logistice Speciosa* is the literal algebra, as distinguished from *logistice numerosa*, or common arithmetic. Here are various questions in algebraical addition and multiplication: the powers of a binomial are raised up to the sixth inclusive, and the law of the exponents is given, but not that of the coefficients. Particular notice is taken of the addition of powers of A+B and A−B, and, in a few cases, of the composition of A^n-B^n. Various methods are given of forming right-angled triangles whose sides shall be whole numbers.

(R. M.) *Zeteticorum libri quinque*. The first book contains problems producing simple equations, of which the following are specimens:—Given $x \pm y$, $x \pm z$, and the ratio of y to z, to find x; given the sum or difference of two numbers, and of given proportions of those numbers, to find the numbers. Here, as elsewhere, Vieta uses the capital letters only, and represents the unknown quantities by vowels, and the known quantities by consonants. The second book is full of those problems of the second and third degree, which produce unadfected equations, solved as in our modern works. The third book contains the reduction into equations, and solution, of questions in proportion, and also of right-angled triangles. The fourth and fifth books give the solutions of various of those problems now called Diophantine; mostly collected from Diophantus himself. We find here the first use of the vinculum connecting terms whose result is considered as a whole. Blancanus says that Cataldi explained this work of Vieta in what he calls 'continuatio algebræ proporzionalis,' which cannot be the 'nova algebra proporzionale,' Bologna, 1619, published after Blancanus wrote.

(R. M. as to the first, not the second.) *De Æquationum Recognitione et Emendatione libri duo*. It was put together by Alexander Anderson, who obtained the materials from Alelmus or Aléaume (who had charge of Vieta's papers), and published these books at Paris in 1615. The first six chapters of the treatise *De Recognitione* are employed in demonstrating that equations of the second and third degree spring from questions upon three and four continued proportionals, except in the irreducible case of the latter species, which is shown to depend on the trisection of an angle. Where a cubic equation has one root only, and that negative, the equation is declared which has the corresponding positive root. The two roots of an equation of which one is negative are not considered, but the equation is deduced which has a positive root corresponding to the negative root of the former, and this equation is called contradictory to the former. Various methods are found by which an equation of a higher degree may be deduced from a given one, a synthetical process apparently introductory to the subsequent depression of equations. In the treatise *de Emendatione* Vieta lays down rules for destroying the second term of an equation of the second or third degree. He then shows, in a cubic equation which has the highest term negative, how to avoid this by a transformation which is in effect finding the equation whose roots are reciprocals to the roots of the former equation. We have not space to enter minutely into the various transformations: we will only remark generally that an equation is considered unfit for use in which the highest power of the unknown quantity is negative, or has a coefficient, and that the greater part of the reductions employed would not be necessary to a modern analyst. These books leave the reader in possession of the methods then known for the depression or solution of equations of the second, third, and fourth degrees. They are a luxuriant exercise of the power newly derived from Vieta's improvements in notation. He concludes by showing how to construct an equation which shall have given positive roots; which forms the suggestive basis of the subsequent discoveries of Harriot. On this he observes, 'Atque hac elegans et perpulcræ speculationis sylloge, tractatu alioquin effuso, finem aliquem et Coronida tandem imponimus.' Dr. Hutton mistranslates when (*Hist. Alg. Tracts*, vol. ii.) he concludes from these words that Vieta only announced the theorem, 'and for this strange reason, that he might at length bring his work to a conclusion.' Nevertheless Hutton's account is generally a very good one.

(R. M.) *De Numerosa Potestatum purarum atque adfectarum ad exegesin resolutione tractatus*. This work, first published, with Vieta's consent, at Paris in 1600, has at the end a letter (hereinbefore referred to) from Ghetaldi to Michael Coignet, a Belgian mathematician, who states that at his earnest entreaty Vieta had consented to allow the work be published, on condition that he (Ghetaldi) would take e trouble of editing it. This letter mentions the seven ooks of the *Responsa*, the *Harmonicon Cœleste*, &c. The *umerose exegesis*, as the method herein explained was frequently denominated, is given, with the most modern improvements, in the article Involution and Evolution, nd its history will be found in the 'Companion to the lmanac' for 1839. It passed through the hands of Harot, Oughtred, and Wallis, with some improvements, but as so prolix, and required so much calculation, that when ewton's method appeared [Approximation; Theory of quations] it gradually sank out of use. The late Mr. orner of Bath, reproduced it, with a capital improvement the mode of making the successive computations, which ill establish it permanently. Very recently, Mr. Thomas eddle of Newcastle, author of 'A New &c. Method of lving Numerical Equations,' has produced the kindred ethod of finding the highest denomination of the root, d correcting it by successive *multiplications*, instead of ditions: a method which has considerable advantages hen the degree of the equation is high. To return to ieta: when the root is irrational, and any given degree of proximation is required, instead of using fractions, the uation is found whose roots shall be ten, or a hundred, c., times the root of the given equation, which roots are en extracted by the method within a unit. The introction of our notation for decimal fractions had not taken ace at the time we are speaking of, though we should t be justified in drawing this conclusion from the mere ct of not finding it used by Vieta. From his avocations, rhaps, but more from the imperfect modes of communiation (for there were then no scientific associations), he ppears not to have been perfectly aware of what was ing on in other parts of the mathematical world. So at it is impossible to say, at present, whether some of the ings which we know to have been discovered before his ne, may not have been, as far as he knew, the fruits of own investigation. 'He neglects to avail himself of e negative roots of Cardan' (but this however was done, principle, and from a determined refusal of all symbolil extension), 'the numerical exponents of Stifelius, inad of which he uses the names of the powers themves; or the fractional exponents of Stevinus; or the mmodious way of prefixing the coefficient before the antity; and such like circumstances; the want of which es his algebra the appearance of an age much earlier n its own.' (Hutton, *Tracts*, ii., 273.) He had however n the exponents of Stevinus, and the prefixed coeffints, for Van Roomen's problem, as given by himself, ntains both.

R. M.) *Effectionum Geometricarum Canonica Recensio* d *Supplementum Geometriæ*. The second of these rks was first published at Tours in 1593. The former these treatises is a collection of problems in common ometry, intended to facilitate the solution of problems the second degree. The second treatise assumes the nstruction of the conchoid of Nicomedes; the finding two mean proportionals, the trisection of an angle, the cription of a regular heptagon in a circle, and the solun of the irreducible case of cubic equations, are made follow. The last of these is contained in the following oposition:—'If there be two isosceles triangles, having e equal sides of one equal to those of the other, and the ual angles of the second triple of those of the first, the be of the base of the first diminished by three times the rallelopiped under the base of the first, and the square the common side, is equal to the parallelopiped under e base of the second and the square of the common le.'

Pseudo-mesolabum. The term *mesolabum* was applied any process by which two mean proportionals could be und between two given straight lines. By *Pseudo*-mesobum Vieta means a process which, though not limiting elf to Euclidean geometry, nevertheless is effective on own suppositions. A chord of a circle cuts a diameter, d a perpendicular from one extremity of the chord cuts e diameter produced, so that the part produced is equal the chord. This being the case, the segments of the ord are mean proportionals between those of the diaeter. In the article Duplication, &c., we have done ieta wrong by imputing to him a great mistake in this atter. The fact is, that when he has finished his pseudolution (merely ungeometrical), he then is ambitious of showing how well he can reason falsely, and ends with a *pseudo*-theorema (meaning one which is avowedly untrue, and given to be afterwards exposed). Now if a man will write a pseudo-method, which he himself defines to mean no more than unallowed by Euclid, and makes his treatise to end in nothing but a *pseudo*-theorema (intended to be false), not even the closest examination will prevent every one from supposing that his pseudo-theorema is the *finis atque corona* of his pseudo-method.

(R. M., in which it is called *Analytica Angularium Sectionum in tres partes distributa*). *Ad Angulares Sectiones Theoremata καθολικώτερα.* This is really Alexander Anderson's publication. Vieta sent him the theorems, he found out the demonstrations, and published them, in 1615, at Paris, with a dedication to Charles, prince of Wales. Among many trigonometrical theorems are here given some of the class of which we shall presently speak with respect to Van Roomen's problem. The chord of an arc being given, the chords of its multiples and of their supplements are found.

Ad Problema quod omnibus mathematicis totius orbis construendum proposuit Adrianus Romanus Responsum. The circumstances under which Vieta first saw this problem have been already stated from Taillemant. It amounts to this: given the chord of an arc, to express algebraically the chord of the 45th part of that arc; but it is given in the form of a proposed equation of the 45th degree. If Vieta sat down at a window and solved several cases while Henry IV. and the Belgian ambassador were talking in the room, it must have been because he was then in full possession of his theory of angular sections, and saw at once that Van Roomen's problem was a particular case of it. But it must not be forgotten that the latter must also have been in possession of the same or of cases of it. This answer of Vieta is a full one, and appears to have been drawn up deliberately: he gives the complete reduction of the problem, with a good deal of what he must have supposed to be fun, but of a very ponderous and sober character. He ends by proposing, in his turn, a problem, evidently directed at Van Roomen, and by way of hit at his fearful equation and enormous coefficients, he says, 'Porro ad exercendum non cruciandum studiosorum ingenia, problema hujus modi construendum subjicio.' The problem is one of Apollonius, of which the solution had been lost,—Given three circles, to find a fourth touching them all.

Apollonius Gallus, seu exsuscitata 'Apollonii Pergæi περὶ ἐπαφῶν Geometria, first published by Vieta at Paris, in 1600, and addressed to Van Roomen. It has, in the beginning, a Greek epistle, anonymously addressed (perhaps by Van Roomen himself) Φραγκίσκῳ Ουιέτῃ, which is a presumption that the true pronunciation is Viĕta. Van Roomen, as appears by the introduction, solved the preceding problem by the help of the hyperbola, on which Vieta rallies him in his manner, and proceeds to a geometrical solution. He then gives geometrical solutions of some problems which Regiomontanus had solved algebraically, but professed himself unable to solve geometrically. He calls himself Apollonius Gallus, and Van Roomen, Apollonius Belga; and from that time it became a fashion for those who had done anything after the manner of a particular Greek, to adopt the name of that Greek, with an adjective of country annexed. Thus Snell, after his measure of the earth, called himself Eratosthenes Batavus.

Variorum de Rebus Mathematicis Responsorum liber octavus. This book, first published at Tours in 1593, is preceded by an epistle from Pet. Da., whoever he may be, which explains why it appeared. It seems (at least it is so asserted) that there was at that time a great excitement at Tours, not only among the educated, but even down to the lowest of the people, about the quadrature of the circle, the problem of two mean proportionals, &c.; and Pet. Da., who had seen Vieta, and knew that he had a book on the subject lying by him, solicited and procured its publication. We have already spoken of the first seven books, which, if they were ever written, are lost. This book contains the history of, and remarks on, the method of finding two mean proportionals, various modes of applying mechanical curves to the quadrature of the circle, approximate solutions of the same problem, and a collection of formulæ for the solution of triangles, with a short chapter on the calendar.

Munimen adversus Nova Cyclometrica. This was a refutation of Joseph Scaliger's asserted quadrature of the circle, though the name of Scaliger is not mentioned in it. This eminent scholar was exceedingly angry, and attacked Vieta with much bitterness. But he afterwards, according to De Thou, changed his tone, admitted his error, and did justice to his opponent. Vieta himself had a high respect for Scaliger, as might be inferred from his suppression of the name. If Isaac Casaubon is to be trusted, he thought most highly even of the mathematical knowledge of Scaliger. In one of Casaubon's letters to De Thou (p. 307 of the collection), he says, that on one occasion he and a friend paid a visit to Vieta, and that, Scaliger's name coming up in conversation, Vieta said, 'I have so great an admiration of that astounding genius, that I should think he alone perfectly understands all mathematical writers, particularly those of the Greeks.' And he added, that he thought more highly of Scaliger when wrong than of many others when right.

Relatio Calendarii verè Gregoriani (Paris, 1600); *Kalendarium Gregorianum perpetuum*, and *Adversus Christophorum Clavium Expostulatio* (Paris, 1602). We have said enough of these unfortunate works in the preceding part of this article. The expostulation is preceded by Greek verses addressed to Clavius.

All the preceding works are contained, in the order in which we have mentioned them, in the collected edition of Vieta's works, edited by Schooten, and printed by the Elzevirs at Leyden, in 1646. It seems that Vieta's papers had either been almost entirely destroyed or else exhausted: for though the Elzevirs, in 1640, advertised their intention of printing such an edition (in the first number of the 'Catalogus Universalis,' an annual book-list, printed at Amsterdam), requesting those who had anything unpublished of Vieta's to communicate it, and giving the names (without dates, unfortunately) of all that had been published, yet they could not print, six years after this advertisement, one single treatise which did not appear in their own advertisement as already known. We have yet to speak of two other works, both remarkable in their way, which are not in Schooten's collection.

Harmonicon Cœleste.—This work has only been recovered in our own day. Schooten's reason for not giving it was, that he could only find an incomplete and inaccurate copy to print from: but he says that he had reason to suppose he should obtain a more complete copy, which he promised to publish with other writings of Vieta; no such work ever was produced. The very year before this preface of Schooten appeared, Bouillaud, in the prolegomena to his 'Astronomia Philolaica' (1645), says that Peter Dupuis (Petrus Puteanus) had lent the manuscript to Mersenne, and that some borrower, or more professed thief (but which is not said), had obtained it from Mersenne, and had never returned it. Some particular person is evidently pointed at: Bouillaud says this borrower would neither restore it nor a copy of it, and suspects that he meant to publish it as his own. Bouillaud was a good authority in this matter: he was known to De Thou, Schooten, &c., and Peter Dupuis was one of his colleagues in the formation of the catalogue of De Thou's library, and perhaps, if the story be true, got the manuscript out of that library to lend it to Mersenne. This story has been repeated in many English writers on this subject, from Sherburne down to Hutton, and always in the same words. Some inquiries which the writer of this article made some years ago at Paris through a most competent investigator, ended in the assurance that it was *in Bouillaud's handwriting* in the Royal Library at Paris, that he (Bouillaud) had himself lent the manuscript to Cosmo de' Medici of Tuscany, which must have been after it was recovered from Mersenne's honest friend, and of course after the publication of the 'Astronomia Philolaica.' Lately M. Libri (*Hist. des Sci. Math. en Italie*, vol. iv., p. 22) announces that there is an imperfect manuscript in the Royal Library at Paris, and that the original manuscript of Vieta (and an old copy, which however is mislaid) is in the Magliabecchian Library at Florence (which confirms the last statement of Bouillaud). He gives a short account of the contents of the Paris manuscript, which contains various modifications of Ptolemy's theory, and sufficient proof that Vieta well knew both the writings of Copernicus and Tycho Brahé. Of the former he says that the excellence of his system, if any, is destroyed by the badness of the geometry by which it is explained; and M. Libri states that he avows his opposition to the heliocentric system still more plainly in other places. There is one conjecture which is worthy of some attention: we have seen how imperfect is the evidence for attributing to APOLLONIUS the opinion afterwards maintained by Copernicus: Vieta asserts that this opinion was called Apollonian, not because Apollonius promulgated it, but because the sun (Apollo) is in the centre of the system.

It was said that the 'Harmonicon Cœleste' was to be published, but it has not yet appeared.

Canon Mathematicus, seu ad Triangula, cum adpendicibus, Lutetiæ, apud Johannem Mettayer, &c., 1579, to which is annexed, with a new title-page, 'Francisci Vietæi universalium Inspectionum ad Canonem Mathematicum liber singularis, Lutetiæ,' &c., as before.

This same book, from the same types, is also found with another title-page, as follows:—'Francisci Vietai opera mathematica, in quibus tractatur canon mathematicus seu ad triangula: item Canonion, &c. &c. &c., Londini, apud Franciscum Bouvier,* 1589.

The same book, again from the same types, is in the British Museum with a third title-page, as follows:—'Fran. Vietæi Libellorum Supplicum in Regia magistri, [illegible] que Mathematici, varia opera mathematica: in quibus tractatur Canon Mathematicus, seu ad triangula, item Canonion, &c., Parisiis, apud Bartholomæum [illegible] &c., 1609.

That the second and third are really the same book as the first, with a new title-page, we have ascertained by carefully comparing various words which are misspelt, and letters and lines which are broken, in all three: also by the fact that the second title-page, 'Francisci Vietæi, &c.' is the same, date and all, in the second. In the third the second title-page is taken out, and Mettayer's address is printed after the first. This book was, from its extreme scarceness, a bibliographical curiosity: we have seen five copies, three with the first title-page, one with the second, and one with the third: in two of the first three, some figures which are not found in the third have been stamped in after the printing; and the same stamping is apparent both in the fourth and fifth. The *canon mathematicus* is the first table in which sines and cosines, tangents and cotangents, secants and cosecants, are completely given: they are arranged in the modern form, in which each number entered has a double appellation. But the notation of decimal fractions not being invented, the mode of description is as follows:—to give the sine and cosine of 24° 2′, Vieta states that, the hypothenuse being 100,000, the perpendicular and base are 40,727 and 91,330 9; and in a similar way for the others: and here it is remarkable that in the cosines Vieta does use a species of decimal notation, leaving a blank space instead of using a decimal point; for, to an hypothenuse 100,000, the base to an angle of 24° 2′ is what we should now write [illegible]. There is also a large collection of rational-sided right-angled triangles, which form a trigonometrical canon, but not ascending by equal angles. The work concludes with a copious collection of trigonometrical formulæ and various numerical calculations, for mention of which see Hutton's 'History of Trigonometrical Tables,' prefixed to his logarithms, and inserted in his tracts. A short preface by Mettayer, prefixed to the 'Universalium Inspectionum,' &c., states that Vieta found great difficulties in getting tables printed at all, and also that plagiarists had printed and sold something of the kind, but what is not stated. Vieta himself (Schooten, p. 323) calls this book *infeliciter editus*, and hopes that a second edition will be of better authority.

Having now given, we believe, as complete an account of Vieta as existing materials can furnish, in consideration of the very meagre manner in which his biography is usually treated (the article in the 'Biographie Universelle' is very poor, considering that the work is French, and Vieta the greatest French mathematician of the sixteenth century), we may speak briefly upon the merit of his writings. Vieta is a name to which it matters little that we have not dwelt on several points which would have made a character for a less person, such as his completion of the cases of solution of right-angled spherical triangles, his expression for the approximate quadrature of the circle, his arithmel extensions of the same approximation, and so on. two great pedestals on which his fame rests are his rovements in the form of algebra, which he first made be a purely symbolical science, and showed to be able of wide and easy application *in ordinary hands;* application of his new algebra to the extension of tri- ometry, in which he first discovered the important tions of multiple angles; and his extension of the ient rules for division and extraction of the square and e roots to the *exegetic* process for the solution of all ations, which, with Mr. Horner's new mode of con- ting the calculation, is becoming daily of more import- e. He did not, as some of the French say, lay down view of equations which was afterwards done by riot, but he gave strong suggestions towards it, stronger gestions than the Italian algebraists had furnished him for his own new algebra: it is Harriot's praise that he how to go on from where Vieta had stopped, as it is of Vieta to have proceeded from the point at which dan had stopped. Neither did he, as some of the French n say (but not from national feeling in this instance), apply algebra to geometry; for if by the application gebra be meant the method of coordinates, that applica- is wholly due to Des Cartes, assisted, no doubt, by the er which Vieta conferred on algebra. But if nothing e be meant than the solution of geometrical problems elp of algebraical symbols and methods, many have ms before Vieta; for instance, Regiomontanus, Cardan, Bombelli. Nay, Vieta himself points out that Regio- ntanus had solved problems algebraically which he com- ned of not being afterwards able to do geometrically; Vieta himself supplies the geometrical verification of giomontanus's algebraical solutions. Neither did he, some of the French again say, show how to form the fficients of the powers of a binomial: he saw, no doubt, connection of them with the series 1, 2, 3, &c., 1, 3, c., 1, 4, 10, &c., as Tartaglia had done before him; he did not show how to form them by any alge- cal law, as Newton afterwards did. If a Persian or an dn, instructed in the modern European algebra, were sk, 'Who, of all individual men, made the step which t distinctly marks the separation of the science which now return to us from that which we delivered to you he hands of Mohammed Ben Musa?' the answer must -Vieta.

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* We cannot find the name of Bouvier in the list of English publishers of the sixteenth century, given in Johnson's 'Typographia.' In [illegible] another instance is given (p. 497) of a foreign book being furnished with a London title-page.

he earliest history of algebra is that contained in the ed treatise of Wallis (in English, 1685; in Latin, 1693). llis had a partiality for Harriot which not only blinded to much of the merit of Vieta, but furnished him with tacles by which he could see most of the discoveries of latter only in the writings of the former. Montucla has y and properly exposed this tendency: but that he be disqualified to throw a stone at Wallis, he, in his gravely and seriously declares that he cannot see the it of the invention of *aa*, *aaa*, &c., to represent the ers of *a*, instead of Vieta's mode. Montucla is not gether fair to the Italian algebraists who preceded ta, as to which he has been severely criticised by sali, and also by M. Libri. But these Italian historians e a corresponding fault: they make a painful endeavour how that the peculiar discoveries of Vieta are to be nd in the writings of their own illustrious countrymen, particularly of Cardan. Cossali will even have it that dan has something equivalent to, or very nearly ap- aching to, Des Cartes's theorem on the roots of equa- s [STURM'S THEOREM]; and constantly endeavours to w that Cardan might, could, would, or should, or ought ave had something which he just stops short of saying dan actually *had*. He wants to make his country- a school of constructive discoverers; if Cardan had y carried the contents of page *x* farther than he did, seen something at page *y* which he did not see, then would have been able at page *z* to do something which did not do, but which Vieta *did* do. M. Libri starts re fairly: 'In France,' he observes (vol. iv., p. 1), ieta made algebra approach nearer to perfection, and, haps, caused the labours of his predecessors to fall into much neglect.' This is perfectly true, and might have en more positively expressed; but a little further on we d (p. 7), 'In truth his discoveries seem to be not com- able to those of Ferro or Ferrari.' This is truly strange: in the next sentence we find he 'was an eminently ilosophical mind, and is more to be admired for his methods than for the results which he obtained from them.' Can it seriously be M. Libri's opinion that the inventor of an isolated result is to be placed above one who increases the power of the human race over every branch of science? and is it not the surest test of the greatness of a discovery, that it is a method, not a result, and that the power which it gives to others makes succeeding results obtained from it more remarkable than those of the inventor himself. If ever it has been true that coming events have thrown their shadows before, it has been in the progress of the mathematics: it never has happened, in the case of any great discovery, that it was made upon quite a clear field. No one can read the history of science without finding that there was always, in the time immediately preceding the promulgation of any new method, a constant tendency towards the invention of that method, a series of efforts the results of which have speedily merged in those of the man for whom the discovery was reserved. This leaves the relative merit of investigators unaltered; if it depress Vieta, it also depresses Tartaglia and Cardan. To us it raises all three: for it points out that they have severally succeeded where their predecessors have failed, and relieves them from the consequences of the supposition that it was merely their good fortune which led their thoughts to that which another might as easily have attained if his thoughts had been turned towards the subject. If sometimes too much Gallicism shows itself, by way of exception, in the admirable history of Montucla, it is not half so offensive as the constant and always recurring nationality of the Italian historians, which renders it necessary to watch them so closely, that the end of it will be a general conviction that they are not to be safely read at all, without the original authorities at hand, on any matter in which claims of country can enter. M. Libri, in finding out, and with perfect correctness, that Cataldi used continued fractions before Brounker, and infinite series (or at least an infinite series) before Wallis, and in making a very just remark on the interest with which the first dawnings of the doctrine of infinites should be regarded, forgets that Vieta had preceded Cataldi, to the extent of using a combination of the infinite product and series united. It would be difficult, we think, to produce an earlier germ of the doctrine just alluded to than is seen in the celebrated expression given by Vieta for the quadrature of a circle, which we should now express thus

$$\frac{2}{\pi} = \sqrt{a}\,.\,\sqrt{(a+\sqrt{a})}\,.\,\sqrt{\{a+\sqrt{(a+\sqrt{a})}\}}\ \text{\&c.}$$

where a means half a unit. (*Resp. Math.*, Schooten, p. 400.)

Both Vieta and Cossali endeavour to show that the Italian algebraists used letters for quantities, both known and unknown. So they did, no doubt, and so did Euclid, and so (according to M. Libri himself) did Aristotle. But who combined the use of letters with that of symbols of operation so as to produce algebraical formulæ, and to give to the operations of algebra that technical character which makes them resemble the operations of arithmetic? One look at any page of the Italian algebraists will show the difference between their algebra and that of Vieta better than any description. Accordingly, both Cossali and Libri state the asserted resemblances without specific citation. When will the writer who asserts that Cardan was substantially in possession of Vieta's algebra attempt to substantiate his assertion by putting so much as half a page of the former side by side with one of the latter?

We now proceed to give some further account of Leonard of Pisa and of Lucas Pacioli, the most celebrated of the very early Italian algebraists. The latter has been accidentally omitted, a circumstance which we do not regret, as it gives us the opportunity of availing ourselves of M. Libri's work hereinbefore cited, and of mentioning the same work in a more satisfactory manner. The author has made most extensive researches in Italian mathematical history, and is, we have no doubt, perfectly trustworthy on all points in which he is not the partisan of a country or a school.

Leonardo Fibonacci (a corruption of *filius Bonaccii*) was the son of one Bonacci, a merchant of Pisa, and was born some time in the twelfth century. He states that his father was employed for the merchants of his own city at the custom-house of an African port, and there made him study arithmetic: he afterwards travelled in Egypt, Syria, Greece, and Provence, and from the various systems of numeration which he saw learnt to value the superiority of the Indian method, which was probably that which his father had taught him. His inattention to matters of commerce, and preference for mathematical pursuits, procured for him, from his countrymen, the contemptuous epithet of *Bigollone*. His *Liber Abbaci* was first written in 1202, and with additions in 1228, when it was dedicated to Michael Scott. The *Practica Geometriæ* was written in 1220. Commandine intended to have published the latter, and Bernard the former, but neither effected his purpose, and, with the exception of the parts which Pacioli afterwards used, and the extensive citations in the notes of M. Libri's second volume, nothing of Fibonacci's has yet appeared. There was also a work on square numbers of which the manuscript is known to have existed at Florence in 1768, but cannot now be found.

The *Liber Abbaci* is a work on arithmetic and algebra. M. Libri is of opinion that no Christian writer can be shown to have introduced the Arabic or Indian numerals into any part of Christendom before the publication of this treatise. Such manuscripts as exist, and which seem to have a prior date, are thought by him to have been written either by Jews, or by Spanish Christians among the Moors. Dr. Peacock (*Encycl. Metrop.*, 'Arithmetic') had arrived at the conclusion that Fibonacci's works were the earliest in which these figures can be traced. It is remarkable that their writer was only known by name in the middle of the last century, when the manuscripts of which we now speak were discovered at Florence by Tozzetti. But the intentions of Commandine and Bernard show that they were known at an earlier period.

The fifteenth chapter of the 'Liber Abbaci,' which contains the treatise on algebra, has been cited in full by M. Libri. Any one who will compare it with Dr. Rosen's translation of Mohammed ben MUSA will see a resemblance which tends to confirm the general supposition (which also, according to Cardan, may be inferred from the express words of Fibonacci himself) that the Arabic work just named was that from which algebra was made European, though there is every appearance of the avowed translations of it being posterior to Fibonacci. But the latter must either have known other works, or have been an original investigator of great merit. Several things known to the Hindus, but not mentioned by Ben Musa, are contained in his writings. He may have come to these by himself; but it is also certain that the name of the Hindus is frequently mentioned in the manuscripts of the time as that of a nation excelling in these branches of study. A close analysis of the writings of Fibonacci would probably settle whether he is to be considered as having himself enlarged the boundary of the science, or as nothing but the compiler of Oriental works. His merit is great either way; and his name, considerable as it now may be, is nothing to what it will be among the Oriental nations, when they shall have received back the principal which he borrowed from them, with the interest now due upon it, and ready to be paid on demand. The influence of his writings was long felt in Italy, which became from his time the great school of arithmetic; and it is due to him, even now, that his works should be printed entire.

Lucas Pacioli was born at Borgo San Sepolcro, in Tuscany (whence he is frequently called Lucas de Burgo sancti Sepulchri, and Lucas di Borgo), about the middle of the fifteenth century. He was a Minorite friar, and taught successively at Perugia, Rome, Naples, Pisa, and Venice. He resided some time at Milan, in company with Leonardo da Vinci: they quitted Lombardy together on the arrival of the French, and Pacioli spent his last years at Florence and at Venice. He was certainly alive in 1509; but from after that year M. Libri finds no further mention of him as living.

His 'Summa de Arithmetica, Geometria, Proportioni, et Proportionalita' was printed in Italian, at Venice, in 1494. It contains copious extracts from Fibonacci, to such an extent that Pacioli himself warns his reader, where no other authority is mentioned, to infer that Leonard of Pisa is followed. This work was the first printed in algebra, and though it does not advance the science, contains a large amount of details, and carries the practice of algebraical operations into questions of more complexity than any which had preceded, particularly in operations on surd quantities. M. Libri says that the treatise on book-keeping, which forms part of Pacioli's work, is the first in which what is now called the method of double entry appears in print. Some account of the contents will be found in Hutton's 'History of Algebra' (*Tracts*, vol. ii.). The 'Divina Proportione,' Venice, 1509, is thus described by M. Libri: 'Pacioli wished to make a certain proportion,* long known to geometers, the base of all the sciences. He deduces from it the principles of architecture, the proportions of the human figure, and even those which ought to be given to the letters of the alphabet. It is a systematic treatise, of which the principal merit consists in the co-operation of Leonardo da Vinci, who engraved the plates, and probably also superintended the parts which concern the arts. There are some propositions of geometry upon the inscription of polyhedra in one another....There is also the use of letters to indicate numerical quantities.' On this last sentence M. Libri cites a passage containing the use of letters in a simple proportion; and it seems to us that the point which he is labouring to establish, namely, the virtual existence of general algebra before Vieta, cannot be more completely overturned than by this, his only direct quotation on the subject. When M. Libri says that Fibonacci used letters for quantities, both known and unknown, he does not cite a passage, but leaves it to be verified by those who will look over his citation of the fifteenth chapter of Fibonacci, of more than 150 octavo pages. On looking through this we do find a few places where numbers are denoted by single letters; but whenever they are to be divided into parts, double letters are used: in fact, Fibonacci does exactly what Euclid does in the fifth book. Of Pacioli's notation, in the professed algebraical work, nothing is said; but in the work we now mention the quotation which is to establish that Pacioli had substantially the idea of Vieta on algebra contains just as much algebraical notation as, and no more than, appears in Pacioli's own translation of Euclid, published in the same year. M. Libri persists in supposing that the mere use of letters to designate numbers is the sole distinction of Vieta's algebra.

The edition of Euclid, to which we have just alluded, and which appeared in Latin, at Venice, in 1509, is that to which [GEOMETRY, p. 155] we have followed the editor of Fabricius in doubting its existence. We have since seen the work. Heilbronner infers from the preface to the 'Divina Proportione,' that Pacioli translated Euclid into Italian, and it is now known that he did not publish several of his earlier works: but he himself, in the dedication of the work now under mention, speaking of this very Latin Euclid itself, says, 'Leges....vernacula lingua per me donatum Euclidem:' whence it is obvious that by *vernacula* he means the Latin, as opposed to Greek or Arabic. The translation is substantially that of Athelard (which goes by the name of Campanus), and the commentaries of Campanus, or many of them, are added: Pacioli's own additional comments are all headed *Castigator*. All the fifteen books are given which were supposed to be Euclid's.

Pacioli is not to be looked on as a great improver either of geometry or arithmetic: but his utility cannot be denied. It was he who made Fibonacci useful to the world by his compilations from that writer, and he has shown so much learning on the subject, and has drawn from so many sources, that it is not perhaps too much to say that it was better he should have printed the first book on algebra, than a more original but less erudite teacher.

VIGA GANITA, the name of the principal Hindu work on algebra which remains. We have referred to this article all matters which relate to the astronomical and arithmetical science of the Hindus, partly because there is not enough to be said on the subject to make it worth while to distribute it under heads in a work like the present, and partly because it was desirable to defer the article in question as long as possible, in the hope that some further investigation of the points on which we are to write might make its appearance. For it is not a simple record of facts, but an account of the most singular extremes of opinion, which is to be given, almost every point having been discussed in the most extreme spirit of party y every writer whom we have to name, except two. We annot pretend to the knowledge of Oriental matters which necessary to form the most positive judgment upon the ontroversy: but it is of more consequence to our readers see the manner in which the question has been disussed, than to be put in possession of any new statements f opinion; and it is of some importance that those who ay hereafter write on the subject should see that a disosition to support system is soon pointed out, even in rdinary works of reference.

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* We cite it here because we wish to give some account of a work which is usually only mentioned, and because we cannot understand what M. Libri means.

In 1687 La Loubère, returning from his embassy to iam, brought home what are called the Siamese Tables. 1750 Du Champ, a missionary, sent home another set f tables, from Christnabouram (the Kistnabaram of the rdinary maps?), in the Carnatic. About the same time atouillet, another missionary, sent home another set, ameless, but supposed to answer to the latitude of Narsaur, near Masulipatam. In 1769 the astronomer Le entil brought with him from India, where he had been observe the transit of Venus, the tables of Tirvalore. hese were all the documents of Indian astronomy which ere known when **Bailly** published his history of that ibject. The professed epochs of these tables are—Siamese, .D. 638; Christnabouram, A.D. 1491; Narsapur, A.D. 69; Tirvalore, B.C. 3102, the beginning of the Cali Yug, fourth great age of the Hindus.

These tables, with the exception of some remarks by . Cassini and Legentil, excited no great notice till they apressed the active imagination of **Bailly** with the idea at the epoch of the Tirvalore tables was that at which ey were actually made, and that consequently they reresent actual observations made nearly five thousand ears ago. We have seen, in the article cited, the manner which he rode this singular hobby, and how he even anged it at last for one still more strange, in inventing a ople unknown to history to be the original progenitors of l astronomical science. Bailly had learned from his Inan teachers not to be nice about a few thousand years: it, as it has been mercifully said that we are not to judge the temptation to which a man has yielded without king into consideration the amount which he may possiy have resisted, we may remember that the Hindu lpa was upwards of four hundred millions of years, and at Bailly, when at his wildest, never asked for more than ght or nine thousand. His latest opponent, Bentley, who, we shall see, had the same sort of fault as himself, petimed for and obtained a sort of certificate in his own vour from Maskelyne, who states that, to his knowledge, lande and Laplace considered Bailly as a superficial tronomer and an indifferent calculator. But Bailly was etter *calculator* than Laplace, and a better *astronomer* the sense in which Laplace was an astronomer) than lande.

The antiquity of Hindu astronomy found favour in the es of Playfair, and was supported by him in the 'Edinrgh Transactions,' in a paper which is reprinted in his scellaneous works. It was opposed by Leslie, who garded everything Indian with abhorrence: his gross norance and reckless assertions were exposed by Coleooke (*Algebra*, &c. Introduction, p. 59). Playfair's only ithority was Bailly: and his paper amounts to little more an a reiteration, in his own elegant manner, of the main ints of Bailly's argument. Sir W. Jones evidently leans the side of antiquity, and, placing the foundation of the dian system about B.C. 2000, seems to suppose that asonomical knowledge was nearly of as old a date: but he es not enter into the question as a mathematician. We xt come to Delambre, a mind the opposite of Bailly's in ery particular: he was seduced by the regular and demonrated systems of the Greeks into the belief that the origin all astronomy which deserves the name must have been recian. Relying upon nothing but contemporary written ocuments, his mode of meeting every conjecture, howver probable, is simply that of treating it as conjecture. is evident that the spirit of system is as strong in him as Bailly, the current only setting in a different direction: is mode of arguing equally keeps out truth and falsehood, hen it comes on unwritten evidence. The admissions hich he is obliged to make in favour of Indian arithmetic nd algebra are evidently wrung from a most unwilling oul: and not content with overthrowing most completely he premises of Bailly's argument, he endeavours to innuate that all the astronomy of the Eastern world either did come or might have come from the Greeks: in his mind the latter is the same thing as the former. Much of the matter of Delambre's chapters on the subject is drawn from the writings of Davis and the earlier writings of Bentley. Colebrooke's 'Algebra,' &c. only appeared in time for him to consider it in the preface to the History of Astronomy in the Middle Ages. He did not see Colebrooke's work: the account of it in the 'Edinburgh Review' was, he says, better *for his object* (and he puts it in Italics) than the work itself, on account of the accompanying remarks. It is the only instance that we can find in which an article in a review serves Delambre's purpose better than the historical documents on which it was written.

Since the time of Bailly, three Anglo-Indians have written on the subject of Hindu science, more or less controversially: Samuel Davis, Henry Thomas Colebrooke, and John Bentley. The first two are the only writers in our list who seem to have no personal wish that the astronomy of which they treat should have any particular date. Mr. Colebrooke states that Mr. Davis was the first who opened to the public a correct view of the astronomical computations of the Hindus. Mr. Colebrooke was one of the most eminent of Sanscrit scholars, an indefatigable Indian antiquary, and more than well informed in mathematics and astronomy. His account of the Hindu systems of philosophy, as published in his 'Miscellaneous Essays,' [**Veda**] is by far the best which exists; and all that he has written on their science is done in the most careful and conscientious spirit. We may even say that it was his bias to allow the least possible weight to his own arguments, and the greatest to all that could make for his opponents. For instance, when he has brought the time of Aryabhatta (presently mentioned) to 'some ages before the sixth century,' he places him in the fifth century A.C., and requires no other conclusion to be granted. But when he comes to speak of Diophantus (of whom, the earlier he wrote, the more likely is it that he did not borrow his algebra from India), he is willing that it should be 'confidently affirmed' that he cannot be later than the fourth century, because (such are his grounds) Suidas states that Hypatia wrote a commentary on some Diophantus, most likely the writer now known by that name, and an author of uncertain date in the 'Anthologia' wrote an epigram upon him. Throughout his writings there is this apparent carelessness of making the most of his own argument, and the least of that of his opponents; to an extent which, while it makes us feel we are certainly on the safe side in following him, causes us to regret that so cautious an investigator should not have given us his limits in both directions. We consider him by far the safest guide, both in point of learning and judgment, taking the former from the general report of Oriental scholars; and accordingly we shall represent him as to dates and facts, even where we do not follow him.

Mr. Bentley, the last named of the three, is the Bailly of those who oppose the antiquity of Hindu astronomy. In his earlier writings, which are to be found (as well as those of Davis and some of those of Colebrooke) in the 'Asiatic Researches,' he does not deserve any such epithet; his opinions, though strong, are accompanied by their supports, or what he takes for such, moderately stated. His paper 'On the Antiquity of the Surya Siddhanta' was published in 1799: it was not till 1823 that he published at Calcutta his 'Historical View of the Hindu Astronomy,' which was reprinted in England in 1825. It is in this work that he has surpassed Bailly in his own line. The Hindu works are forgeries by the dozen: Bentley knows who forged them, and why. The upholders of Indian antiquity are dupes, or worse: they are to take the stain (see his preface) of supporting all the horrid abuses and impositions of the Hindu superstition, 'the burning of widows, the destroying of infants, and even' (even!) 'the immolation of men.' They conspire to overturn the Mosaic account; and they calumniate[*] the just endeavours o those who attempt to stop the torrent of imposition. It is worth while to state an instance or two of Mr. Bentley's mode of proceeding, as some of our readers may have no other authority on the subject.

Bhascara, the author of the Liliwati and Viga Ganita, lived, according to Mr. Colebrooke, who gives his reasons, in the twelfth century. A version of the former, by one Faizi, was made, at the command of the emperor Akbar, in 1587. It does not please Mr. Bentley that it should be so, and he accordingly informs us that Bhascara's work was presented to Akbar, the author being then alive; but that, in order to give a false antiquity to the work, it was represented as that of another Bhascara, who lived some centuries before. Not a single hint at any authority is given: it is a simple statement, as of the author's own knowledge; and is only one out of hundreds of the same kind, all of which Mr. Bentley calls in different places 'absolute facts,' 'demonstrated facts,' &c.

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[*] The 'Edinburgh Review' had an article of moderate opposition against Mr. Bentley's system: from his expressions any one would suppose they had done him a most unjustifiable injury.

Again, Mr. Colebrooke mentions a treatise which he found in his library, the Siddhanta-Sphuta. This is one of Mr. Bentley's mass of forged treatises: but in this instance he declares he knew the forger. A native, he says, offered his services to him, informed him that his profession was *book-making*, in rather an odd sense, for he said he could forge any book whatever. This native was, after being contemptuously dismissed by Mr. Bentley, in the employment of Mr. Colebrooke: at least so the former affirms, and on this native he fixes the forgery, as he asserts it to be, of the Siddhanta-Sphuta, giving us to understand that the keen and critical eye of Mr. Colebrooke could be deceived by so shallow an artifice as a recent forgery laid among his papers by his own servant. And he makes this adroit native interpolate other books of Mr. Colebrooke's, so that the latter, in fact, had a manufactory of falsified history on his own premises, from which his opponent could destroy the genuineness of any passage he pleased. Mr. Bentley does not tell us in what language he talked with this native, but we strongly suspect that they misunderstood each other.

On the ground of the complete absence of all reference to authority, the certainty of all the conclusions (for there is rarely an admission of any degree of probability less than certainty), and the temper of the writer, who sees nothing but folly or fraud in every one who differs from him, we feel justified in assuming that Bentley is no authority whatsoever in the matter. Had it not been for Colebrooke (for Davis does not go into the subject to a sufficient extent), we could but have recommended our reader to make up his mind first, and then to read the arguments of the writer who favoured his own opinion.

We had written thus far on the subject of Bentley's views and methods, and had sent the article to the press, when we learnt that Colebrooke had answered his last work in the 'Asiatic Journal' for March, 1826. We had imagined that, trusting to the excuses of his age and of the improbability of his reputation being affected by the mere assertions of so wild a writer, Colebrooke had not thought it necessary to make any reply. The answer does in truth not occupy more than seven pages of the periodical above cited, but it sets in array such a number of inconsistencies, as well as of simple unsupported assertions, that we are now very confident of our opinion of Bentley as derived from his writings being a correct one. An unexceptionable living authority, who knew Bentley, informs us that his supposed system of forgeries of Hindu writings was a sort of monomania with him, on which he was quite deaf to argument and testimony; and Colebrooke, in the answer just referred to, says, 'he bore animosity to me and to every one who did not implicitly adopt his opinions concerning Hindu astronomy.' We should have supposed the first from his writings in general, and the second from the heat of his attack on the very quiet criticism of the 'Edinburgh Review.' With respect to his asserted forgery of the 'Brahma Sphuta Siddhanta,' Colebrooke says it is 'an idle guess, untrue in all its particulars.' But he turns the tables on his opponent, as follows:—'Bentley has reasoned on a treatise in his possession, which he calls the Arya Siddhanta, and asserts to have been written by Aryabhatta.' Colebrooke says that none but Bentley had seen this work; that the manuscript was not forthcoming, that Bentley himself did not understand Sanscrit, that the natives about him well knew his notions, and that he was as likely as his friend Colonel Wilford (who from his ignorance of Sanscrit had had some very curious impostures palmed upon him) to have been imposed upon. With regard to his own manuscript, Colebrooke adverts to the fact of its being (with the rest of his Oriental library) deposited at the India House, in a situation accessible to Sanscrit scholars. And with respect to Bentley's celebrated test, namely, that tables must have been constructed at the time when they best represent the state of the heavens, Colebrooke adverts to an instance in which Bentley himself was obliged to abandon it, because it would have proved that a certain set of tables, which now exist, *were* written fourteen hundred years *hence*. But as we have nothing here to do with Bentley, except to give sufficient reason for not taking as an authority a writer whose name is very well known (perhaps better than that of any recent writer) in connection with our subject, we refer the reader to the *Asiatic Journal* (March, 1826, vol. xxi.) for further information.

The writers who are most cited by Hindu astronomers bear the names of Varaha-mihira and Brahmegupta. The astronomers at Ujein place the latter at A.D. 628, and Mr. Colebrooke, from his own description of the position of certain stars with respect to the equinox, thinks he lived towards the end of the sixth century. His work, called the Brahme-sphuta-siddhanta, generally referred to under the name of Brahma-siddhanta, which appears to be a correction of a treatise of the latter name, was found in an imperfect state by Mr. Colebrooke. He informs us that it consists in the computation of mean motions and true places of the planets; solution of problems concerning time, the points of the horizon, and the position of places, calculation of lunar and solar eclipses; rising and setting of the planets; position of the moon's cusps; observation of altitudes by the gnomon; conjunctions of planets with each other and with stars; the astronomical sphere and its circles; the construction of sines; the rectification of the apparent planet (?) from mean motions; the cause of lunar and solar eclipses; and the construction of the armillary sphere. It also contains algebra and mensuration.

From his astronomical data, Colebrooke infers that Varaha-Mihira wrote at the end of the fifth century, which is also the date assigned to him by the astronomers at Ujein. He is the author of a system of astrology (including astronomy) which he declares he has compiled from earlier writers. There is another Varaha-mihira, whom the same astronomers place in A.D. 200. But popular tradition places Varaha-mihira in the time of Vicramadytya (B.C. 56), and names, as hereafter noticed, several of his contemporaries. No historical evidence tending to impeach this tradition has yet been put forward, not prominently at least.

Aryabhatta, known to the Arabs under the name of Arjabahar, is placed by Colebrooke, after much discussion, at not later than the fifth century, possibly not far from the first. He wrote both on astronomy and algebra, but none of his writings have been found, except in citations.

Authors prior to or contemporary with the last-named are mentioned by name, and even cited: such are Pulisa, Parasara, and others; but none of their writings are preserved.

Bhascara Acharya, the author of the Lilawati, Vija Ganita, Siddhanta-siromani (of which the two former are parts), and other works, is very confidently placed by Colebrooke A.D. 1150.

The celebrated work on astronomy, the Surya-siddhanta, is of uncertain date. The term Siddhanta means a system of astronomy, and Surya is the sun. The oldest writings mention a work of this name, and the Arabs state that among the systems of astronomy of the Hindus there is one called Arca (or solar). The tables mentioned at the beginning of this article are generally admitted to have been substantially taken from the Surya-siddhanta, as it now exists, or from a common source: but whether the work which now exists is that which was mentioned by the ancient writers may be strongly doubted. Bentley (in one of his early papers, before he became his reader's sole authority) has discussed the question, and assuming that the age of a table is most probably that at which, one result with another, it best represents the heavens, has deduced the year A.D. 1000, or thereabouts, for the age of the Surya-siddhanta. The principal is a fair one; and Colebrooke at one time acknowledged great force in Bentley's argument. But it is notorious that the Hindu writers were in the habit of correcting their works from time to time, without altering their names; so that it is very possible that there may always have been a Surya-siddhanta, from the earliest times of Hindu astronomy. The name of the author, according to Bentley, is Varaha-mihira; but Colebrooke does not mention any author, as far as we can find.

nd certainly disputes Bentley's assertion, which also over- rns itself, thus:—Bentley's method (which was also that f Bailly and Playfair, though their conclusions were very ifferent), as applied by himself, throws the tables of Brah- egupta into the sixth century: now Brahmegupta men- ons Varaha, who is nevertheless, by Bentley's own con- lusion from another source, the author of the Surya-sidd- anta in the eleventh century. Perhaps it was this di- mma which drove its author to assert forgery upon rgery, until he had set all right.

It thus appears that there is ordinarily good evidence for succession of writers from the commencement of the hristian era up to the twelfth century, with no very great lowance of antiquity to those who are cited by the ear- st writers now remaining. There would be nothing ex- tordinary in the supposition that the chain of authors ent back to the time of Alexander at least, since it is cer- in that the Brahminical system existed before the time of at conqueror. The only question which is worth discussing whether anything was received from the Greeks, and if whether it was without interchange, and enough to give a right to say that the Greeks were the primary instructors the Hindus. If not, then it is to be settled whether the indus were the original instructors of the Greeks. It is ly with reference to this question that the antiquity of indu astronomy is of much independent interest, as a atter of discussion at least: if the astronomy travelled stward, then we must place a flourishing period of it fore the time of Thales, and the only thing to be said is, at we must probably wait for the actual ascertainment the most active age of Hindu science, till we know that other things. But if it travelled eastward, it must be etty clear, from the dates given above, that it was the ience of Hipparchus and his successors of the period eceding Ptolemy, and not that of Ptolemy, nor of his racen followers, which was communicated to the Hindus.

There is some evidence of communication between the eeks and Hindus, such as it is: but neither Delambre r Bentley could produce it. All that can be obtained m the actual theories and methods amounts to very tle indeed, in establishing any connexion: while there hints and processes by the dozen to which there is no semblance whatever in the Greek writings. Varaha- hira, according to Colebrooke, says that the Yavanas nians or Greeks) are barbarians, but that this science tronomy) is well established among them, and they (the rned in it, we suppose) are revered like holy sages. e name of Yavana-charya, which occurs frequently in ndu compilations, is thought by the same writer to have erence to some European; and he thinks he sees in a k entitled Romaca-Siddhanta a title which has some usion to the astronomers of the West. But nevertheless another place Colebrooke cites one *Yavane*swara as nown Sanscrit writer. Besides this, there are several ds of Greek origin, and used in their Greek meaning. st *hora*, for astrological prediction, in the sense of deter- ning the *hour*—'Varaha-mihira... derives the word from *ratra*, day and night.... But this formation of a word, dropping *both* the first and last syllables, is not con- mable to the analogies of Sanscrit etymology.' Next *schcana*, used in the same astrological sense with the eek δεκανος and Latin decanus. Thirdly, for the minute a degree, the Hindus have adopted, besides their own , one taken from the Greek λεπτα, hardly altered in the script *lipta*. This word, in Sanscrit, means smeared, cted with poison, eaten; and the dictionaries give no rpretation that has any affinity with its special accepta- as a technical term in the writings of Brahmegupta. *dra*, for centre, resembling the Greek κεντρον, is not ily traced to any Sanscrit root. If to all that precedes add that the Hindu astronomy employs epicycles about much as Hipparchus appears to have done, but stops idedly short of the use of them made by Ptolemy, it ms very likely, especially when we consider the age in ich their earliest cited writers must be placed, that they some communication with the Greeks, or their writ- s, before or immediately after the Christian æra. And surmise, founded on the points of resemblance between r astronomy and that of the Greeks, receives an addi- al probability from the state of their political affairs. the first century before our æra was the celebrated ce Vikramaditya of Ujein, from whose reign the s of the Samvat æra are counted (B.C. 56). Varaha-mihira, whom Colebrooke leaves somewhere in the fifth century, is the name, according to Professor Wilson, of one of nine who were called the gems of the court of this prince. The prince just mentioned was a noted promoter of knowledge, and the period was a remarkable one. It is not unreasonable to suppose that at this period, which is intermediate between the times of Hipparchus and Ptolemy, an effort was made to obtain information from Greek writings: nor would it be unlikely that at the same time those notions of algebra from which Diophantus wrote his work were given in exchange. It is exceedingly difficult to make any other conjecture which will explain the existence of this solitary work on algebra among the Greeks; but that the Hindus received at this time *all* their astronomy is very unlikely. In several points it differs materially from the system of the Greeks, and in some it is more correct: for instance, in the precession of the equinoxes, the length of the tropical year, and the synodic period of the moon.

It is worth noting that the disposition which existed among Greek writers to send their old sages to India to learn the principles of astronomy and other sciences does not commence till after the Christian era.

We may now leave the question of the antiquity of Hindu science, and proceed to give some account of its materials. The works in which it is contained are usually written in verse, and in short and obscure precepts, intended to be committed to memory: the commentators take every verse, and almost every word, in succession. The most peculiar feature of these books is the general absence of demonstration: results only are frequently announced. It cannot be denied that there is, particularly in the algebraical part, a frequent succession of steps, of which the connexion is pointed out in a manner which makes the last of those steps a necessary consequence of the first. But though a Hindu writer may fall into the road of demonstration in any part of his journey, and remain there for a time, it is evident that this is with him entirely a matter of convenience, and that he does not feel himself at all bound to give proof.

It seems to us by no means to be taken for granted that there ever was any such thing among those writers, or their predecessors, as a connected system of demonstration; there are few propositions either of their geometry or algebra which might not have been found by trial, and verified numerically or graphically; or else procured from empirical propositions by the mode of occasional demonstration just alluded to. But it must be allowed that here and there we have a proposition for which it is difficult to suppose an origin without presuming, not only power of demonstration, but methods of considerable generality. Though the Greeks, after the time of Euclid, never published anything of a mathematical nature without demonstration, it does not follow that even they had demonstration from the beginning; and the hints given by Proclus on the progress of geometry would almost support the contrary notion. The idea of an undemonstrated mathematical system may appear a strange one, but it must be remembered that the nations of modern Europe are, in this matter, the pupils of the Greeks, and never, till of late years, even so much as heard of any science which was independent of their own masters, except what has been added among themselves; and it is no wonder that any different mode of proceeding may seem strange, when the mere possibility of such a mode has never been made a matter of discussion among us.

The following is Colebrooke's comparison of the daily motions of the several planets, according to the Hindus, Ptolemy, and Lalande (it is not worth while to substitute any astronomer more modern than the latter). Degrees, minutes, and seconds, are common to all:—

	Brahmegupta.					Surya Siddhanta.		Ptolemy.		Lalande.	
	°	′	″	‴	iv	‴	iv	‴	iv	‴	iv
Sun . .	0	59	8	10	22	10	10	17	13	19	48
Moon .	13	10	34	52	47	52	3	58	30	61	40
Moon (synodic) .	12	11	26	42	25	41	53	31	17	41	52
Mercury .	4	5	32	18	28	20	42	24	12	34	13
Venus .	1	36	7	41	35	43	39	43	6	48	24
Mars . .	0	31	26	28	7	28	11	36	53	39	23
Jupiter .	0	4	59	9	0	8	48	14	26	15	53
Saturn .	0	2	0	22	52	22	53	33	31	35	38

It appears then that Ptolemy's daily motions are generally too small, but that the Hindus err still more in the same direction; except only in the synodic motion of the moon, in which they are much more correct than Ptolemy: the Surya Siddhanta in particular, probably the later work of the two, and therefore the more likely to be misled by Ptolemy's numbers if they were known, agrees entirely with Lalande. This is what might have been expected: the Hindus were not, as far as appears, noted for good observations, nor very apt to record them; but they sedulously attended to eclipses, the prediction of which was the most important duty of the astronomer, and hence the goodness of their determination of the moon's *synodic* motion.

The length of the sidereal year is given $365^d\ 6^h\ 12^m\ 30^s$, more than three minutes too much: the Hindu astronomical year is sidereal, and begins when the sun enters the sign of the Ram. But their tropical year is $365^d\ 5^h\ 50\frac{1}{2}^m$, much nearer the truth than that of Ptolemy and Hipparchus, which was $365^d\ 5^h\ 55^m$. The meridian from which they reckon is that of Lanka, which some take to be Ceylon, others the name of a lake near the sources of the Ganges: it passes through Ujein. Their precession of the equinoxes is 54″ in each year, which is much more correct than that of Hipparchus or of Ptolemy. Most of the Hindu writers do not suppose a permanent precession, but imagine the oscillatory motion or trepidation, as it was called when it was afterwards introduced into Europe by the Arabs, who seem to have borrowed this idea from India. Those who hold the oscillatory motion fix it at from 24° to 27° on each side of a mean position. The revolutions of the apsides and nodes of the moon are given within a fraction of a day of what they are now known to be; the obliquity of the ecliptic is 24°, too large even for their time. The inclination of the moon's orbit is made 4° 30′; those of Mercury, Venus, and Saturn, 2° each; of Mars 1° 30′; of Jupiter 1°. The circumferences of the orbits (obtained, it is said, upon the purely speculative idea that they all move with the same actual velocity) are given in *yojanas*, a measure which appears to have been used in different senses, and which cannot be very well settled. This *yojana* contains four *crosas*, and the modern crosa is 1·9 statute miles. According to Colebrooke, Aryabhatta gave 3300 yojanas for the circumference of the earth, which, if the crosa were the modern one, would be 25,080 statute miles, or 69·7 miles to a degree: this degree of accuracy must be accidental. With regard to the motions of the nodes and apsides of the planets, which the Hindu writers profess to give, Colebrooke thinks they are inventions constructed from analogy with those of the moon. As to the more theoretical parts of astronomy, the Hindus knew the inequality of the planetary motions which is called the equation of the centre, though their values of these equations are not very correct. They had about as much of that which was afterwards called the Ptolemaic system as is reported to have been invented by Hipparchus; the principal variation being that their epicycles are made (by several of their astronomers) oval, instead of circular. This is enough of the actual details of the astronomy for our present purpose; those who would know more of it must search the tedious and disjointed pages of the authors whom we have cited. No one of them would trouble himself to collect into one page the actual numerical elements of the astronomy on which they were all writing; and it is consequently so difficult to understand their several accounts (since, in case of apparent contradiction, we cannot know whether they speak of the same or of different values of the elements), that we have not felt ourselves able to supply the deficiency. It is not however of much consequence, for the elements of the Hindu astronomy are only interesting as connected with its date and the discussions upon it. We have not at all entered upon the refutations which it is still customary to give to Bailly on points connected with the theory of gravitation. That writer imagined that by correcting the various elements of the planets as they now are, so as to reduce them to what, according to the Newtonian theory, they should have been at the beginning of the Cali Yug, a remarkable agreement was found between the results and the recorded elements of Hindu astronomy. There is such agreement in one or two cases, but the result of the whole is, that there is no reason to suppose the few accordances to be due to any thing but accident.

The mixture of the mythological, which some of the Hindu astronomers * allow to appear in their works, and which seems to have belonged to the vulgar creed, presents a very strange appearance. Both in Hindu and Burman systems eclipses are caused by a distinct planet, Rahu, of a dark essence, which at times takes both the sun and moon under its influence. The irregularities of the planetary motions, their stations, retrogradations, and departures from the ecliptic, are caused by deities provided for the purpose, who reside at the nodes and points of conjunction. Aryabhatta, according to Colebrooke, not only gave the true solution of the phenomena of eclipses, but asserted the diurnal motion of the earth, which he affirmed to be carried round an axis by a strong wind. Brahmegupta attributes this opinion to him with reproach, and asks why, in such case, lofty bodies do not fall (that is, off the earth). A commentator of Brahmegupta, who lived before the twelfth century (since he is mentioned by Bhascara), and whose name (Prithudaca Swami) deserves to be mentioned, in spite of our wish to keep as clear of these unretainable appellatives as we can, says—'The objection that lofty things would fall is contradicted; for every way the under part of the earth is also the upper, since wherever the spectator stands on the earth's surface, even that point is the uppermost point.' But the same commentator adds a very scholastic reason for the earth's motion causing the diurnal changes. He says a planet cannot have two motions; meaning that the orbital motion is the only one it can have, and that the diurnal motion is therefore to be attributed to the earth.

The great point of contest seems to have been whether the earth is stable in space or perpetually falling; if the former, whether it stands by itself or upon a support. We do not find that any astronomers cited by our authorities support the notion which our books attribute to the Hindus, namely, that the earth stands upon an elephant which itself stands upon a tortoise, which tortoise swims in a sea of milk: but there is an allusion to this succession of supports in a passage of Bhascara cited by Colebrooke, which is on other accounts worth the quoting. The Jains, a species of Buddhist sect, affirmed the falling motion of the earth; on which Bhascara remarks—'The earth stands firm, by its own power, without other support, in space. If there be a material support to the earth, and another upholder of that, and again another of this, and so on, there is no limit. If finally self-support must be assumed, why not assume it in the first instance? Why not recognise it in this multiform earth? As heat is in the sun and fire, coldness in the moon, fluidity in water, hardness in iron; so mobility is in air, and immobility in the earth, by nature. How wonderful are the implanted faculties! The earth possessing an attractive force' (like the attraction of the loadstone for iron, adds a commentator), 'draws towards itself any heavy substance situated in the surrounding atmosphere, and that substance appears as if it fell. But whither can the earth fall in ethereal space, which is equal and alike on every side? Observing the revolution of the stars, the Bauddhas (Jains) acknowledge that the earth has no support, but as nothing heavy is seen to remain in the atmosphere, they thence conclude that it falls in ethereal space. Whence dost thou deduce, O Bauddha, this idle notion?' &c. He adds in his notes, 'For if the earth were falling, an arrow shot into the air would not return to it, since both would descend. Nor can it be said that it moves slower and is overtaken by the arrow, for heaviest bodies fall quickest, and the earth is heaviest.'

As to observations and instruments, it is sufficiently evident from the differences between the Hindu system and that of the Greeks, that they must have had both. Their system is more accurate than that of Hipparchus or Ptolemy, precisely in the three fundamental results of widely separated observations—the tropical year, the synodic month, and the precession of the equinoxes. But no observations have been preserved, except indirectly in results; Bhaskara describes nine instruments, including the quadrant, semicircle, circle, armillary sphere, horary ring, gnomon, and clepsydra.

The periods of the Hindus, which were of interest so long as it was a question whether the beginning of the Cali Yug was or was not to be considered as an epoch of actual observation, may now be returned into the hands of the mythologists, warranted as long as ever. A Yug, or age, is 432,000 years; a Maha-Yug, ten Yugs, or 4,320,000 years; a Calpa, or day of Brahma, is 1000 Maha-Yugs, or 4,320 millions of years; and Brahma's life is 100 years of such days and nights, of which about one-half is past. Various attempts have been made to expound these periods by combinations of astronomical cycles; and considering that the number of years in a Calpa has 382 distinct divisors, it is not wonderful that various modes of putting astronomical periods together should seem equally effective in this respect. It is just as well to leave these speculations, and to remark what a power of expressing large numbers was given by the Indian numeration, now universally diffused. Archimedes wrote a book (the 'Arenarius') merely to prove that it was possible to express such numbers as the Brahmins played with in their astronomical computations, and spoke of to the people in the common mythological stories.

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* The author of the Surya Siddhanta and also Bhascara; the latter with apparent reluctance, not in the text, and only briefly in the notes.

The astronomy of the Hindus would have had little interest, but for their arithmetic and algebra. In leaving the former to turn to the two latter, we shall soon cease to feel any surprise at the respect with which the astronomy has been treated, coupled as it is with an arithmetic which is greatly superior to any which the Greeks had, and an algebra which no other nation ever had, except those who derived it from the Hindus. For even supposing Diophantus to have been an original inventor, which we greatly doubt, his work is hardly algebraical, in any sense in which that term can be applied to the science of India.

We shall begin by describing the *Liliwati* and *Viga Ganita*, the proper subject of this article, presuming the reader to be aware that the Indian arithmetic is [Numeration] that which we now use, and that both this arithmetic and algebra were introduced among the Arabs from India (as the Mohammedan writers themselves inform us), through whom they were transmitted to Europe. [Vieta.] Bhascara Acharya (A.D. 1150, as already mentioned) was the author of the Liliwati (called after his daughter [Clepsydra]), and the Viga-Ganita (or causal calculus: *viga*, cause; *ganita*, computation). These two works form the preliminary chapters of the *Siddhanta-Siromani*, an astronomical work of the same writer.

The Liliwati opens with a salutation to Ganesa, the god of wisdom, and then proceeds to describe the system of weights and measures. Then follows decimal numeration, briefly described; and the *eight* operations of arithmetic, addition, subtraction, multiplication, division, square, cube, square-root, cube-root. Reduction of fractions to a common denominator, fractions of fractions, mixed numbers, the eight rules applied to fractions. Cipher;* $a \pm 0 = a$; $0^2 = 0$, $\sqrt{0} = 0$, &c., $a \div 0$, the submultiple of 0, called infinite by the commentator; $a \times 0 = 0$. Inversion of processes, the solution of such an equation as $\{(x \div a) + b\} c - d = e$, which is made a rule of arithmetic. Rule of false position. Rule of concurrence, to solve $x + y = a$, $x - y = b$, and $x \pm y = a$, $x^2 - y^2 = b$. A problem concerning squares, finding pairs of fractions the sum and difference of whose squares, diminished by 1, are both squares. Solution of $x^2 \pm ax = b$. Rule of three. Compound rule of three, various cases. Interest, discount, partnership. Time of filling a cistern by several fountains (a practical matter to those who used the clepsydra). Barter. Presents of gems. Alligation. Arithmetical progression; sums of squares and cubes. Geometrical progression. Right-angled triangles; given two sides to find the third: also to find sides in rational numbers, to a given side or hypothenuse: segments of the base of a given triangle; perpendicular and area, the sides being given. Four-sided figures, areas, &c., sides and a diagonal or perpendicular being given. Many problems relative to four-sided figures. Circumference of a circle is diameter × 3927 ÷ 1250, very nearly; but × 22 ÷ 7 is adapted to practice (the first answers to 3·1416): area is ¼ diameter × circumference: the surface of the sphere is four times that of the great circle: the solidity of the sphere is surface × diameter ÷ 6. Versed sine found from chord of twice the arc and diameter, and the two converses. 'By 103923, 84853, 70534, 60000, 52055, 45922, 41031, multiply the diameter, and divide the products by 120000, the quotients are severally the sides of polygons, from the triangle to the enneagon, within the circle.' To determine roughly the chord of an arc, a rule is used which amounts to the following:

$$\text{sine of } \frac{2 \text{ right angles}}{n} = \frac{16\,(n-1)}{5n^2 - 4n + 4}$$

$$\text{or cosecant of } \frac{2 \text{ right angles}}{n} = \frac{1}{16}\left(5n + 1 + \frac{5}{n-1}\right)$$

For 1° this last gives 56·3 instead of 57·3, and the relative error diminishes up to 90°. A corresponding rule is given for the arc of a chord. The solid contents of a cone, pyramid, cylinder, prism, and truncated cone or cylinder, are then given, and rules for estimating the contents of mounds of different kinds of grain, derived from experiment, the height being greater or less according as the grain is coarser or finer. Various rules on shadows are then given, derived from the geometrical properties of a right-angled triangle, and this is followed by a chapter on the Cuttaca, or pulverizer, presently noticed. The work ends with a chapter on combinations, containing questions of this kind: any number of digits being given, as 5, 5, 7, 8, 6, required the number of different arrangements, as 55786, 57865, 78565, &c., and a rule for the sum of all the numbers thus formed.

The Viga Ganita commences with a curiosity of the Sanscrit language—a sentence in which each of the leading words is threefold in meaning; so that it will bear, and is intended to bear, three different translations, which are as follows:—

1. I revere the unapparent primary matter, which sages conversant with theology declare to be productive of the intelligent principle, being directed to that production by the sentient being: for it is the sole element of all which is apparent.

2. I adore the ruling power, which sages conversant with the nature of soul pronounce to be the cause of knowledge, being so explained by a holy person: for it is the one element of all which is apparent.

3. I venerate that unapparent computation, which calculators affirm to be the means of comprehension, being expounded by a fit person: for it is the single element of all which is apparent.

Bhascara then proceeds thus: 'Since the arithmetic of apparent (known) quantity, which has been already propounded in a former treatise, is founded on that of unapparent (unknown) quantity, and since questions to be solved can hardly be understood by any, and not at all by such as have dull apprehensions, without the application of unapparent quantity: therefore I now propound the operations of analysis (Vija-crya, elemental solution).'

According to Colebrooke, whose words we abridge, the algebraic notation of the Hindus is as follows:—Abbreviations and initials for symbols; negative quantities with a dot; no mark for positive, except the absence of negative. No symbol for addition, multiplication, equality, greater or less. A product denoted by the first syllable of a word subjoined to the factors, between which a dot is sometimes placed. In fractions, divisor under dividend without line of separation. The two sides of an equation are one under the other, confusion being prevented by the recital of the steps in words which always accompanies the operation. Symbols of unknown quantity are various, usually initials of names of colours, except the first, which is the initial of *yavat-tavat*, 'as much as:' Bombelli used *tanto* in the same sense. Colour means unknown quantity, but its Sanscrit also signifies a letter, and letters are also used, either from the alphabet, or from initial syllables of subjects of the problem. Symbols are also used for variable and arbitrary quantities, and sometimes for both given and sought quantities. Initials of square and solid denote those powers, and combined, the higher powers, reckoned* not by sums of powers, but by their products. An initial syllable also marks a surd root. Polynomials are arranged in powers, the absolute quantity being always last, distinguished by an initial syllable denoting known quantity. Numeral coefficients are employed, integer and fractional, unity being always noted: fractional coefficients preferred to division of unknown quantities, and the negative dot always over the numeral, not over the literal character. The numeral coefficient always after the unknown quantity. Positive or negative terms indiscriminately allowed to come first; and every power repeated on both sides of an equation, with nought for the coefficient, when wanted.

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* The reader will easily understand that, to save room, we put down a sort of table of contents, brief, but, we hope, intelligible. When we state a result *algebraically*, we mean the statement for a European abbreviation, not for a transcript from the work. We have not put down some things of minor importance, nor have we taken anything from the commentators without mention.

* In the old times of European algebra, some would call, for instance, the sixth power the *cubo-cubo*, as being $a^3 \times a^3$; others would call the ninth power by the same name, as being the cube of the cube.

The Arabian algebraists have no symbols, arbitrary or abbreviated, either for quantities known or unknown, positive or negative, or for the steps and operations of an algebraic process; but they express everything by words at length. The description of the Hindu notation always led us to suspect that there was some communication with Hindu algebra over and above that which was made through the Arabs; and the preceding account, with that which follows, will lead every one who knows the history of algebra to wish that there had been more of it.

The Viga Ganita contains as follows, it being presumed that the preceding account of Hindu notation will prevent the reader from imagining that the algebraical symbols which we here employ are contained in the work:—The rules for addition, subtraction, multiplication, and division of positive and negative quantities: the rules for the square and square roots of the same, it being distinctly specified that the square root of a negative quantity is imaginary. Rules for the cipher, as in the Liliwati; but here it is more distinctly stated that 'the fraction of which the denominator is cipher is termed an infinite quantity.' The commentator Chrishna is well worth quoting on this point:—'As much as the divisor is diminished, so much is the quotient increased. If the divisor be reduced to the utmost, the quotient is to the utmost increased. But if it can be specified that the amount of the quotient is so much, it has not been raised to the utmost, for a quantity greater than that can be assigned. The quotient therefore is indefinitely great, and is rightly termed infinite.' Then follow arithmetical operations on unknown quantities, and combinations of them. Surds, the usual operations on them, the rationalization of surd denominators, and the extraction of square roots. The rule for the extraction of such a surd as the square root of $a + \sqrt{b} + \sqrt{c} + \sqrt{d}$ is worth citing as a proof of the decided character of their knowledge of this part of algebra. Let $\sqrt{(a^2 - b - c)} = e$, $\frac{1}{2}(a+e) = f$, $\frac{1}{2}(a-e) = g$, $\sqrt{(f^2 - d)} = h$; then the square root required is

$$\sqrt{\frac{f+h}{2}} + \sqrt{\frac{f-h}{2}} + \sqrt{g}.$$

The *Cuttaca*, or pulverizer, is the rule for the solution, in integers, of $ax \pm by = c$; a, b, and c being integers. There is no need to describe it, as it is the rule which is now found in every European book on the theory of numbers, and which proceeds by resolving $a \div b$ into a continued fraction. The Hindus give no use of continued fractions except in this rule, though it is obvious, from the skill with which they manage the reduction of fractions to nearly equal fractions of more simple terms, that they must have applied continued fractions, directly or indirectly, probably by means of this very rule. We do not mean to say that they had continued fractions, but only the processes involved in the use of them, and power of attaining their results.

The *Varga-pracriti*, or principle of the square, is a rule which is remarkable, as the whole of it was not used in Europe till after the middle of the last century. It consists in a rule for finding an indefinite number of solutions of $y^2 = ax^2 + 1$ (a being an integer which is not a square) by means of one solution given or found, and of feeling for one solution by making a solution of $y^2 = ax^2 + b$ give a solution of $y^2 = ax^2 + b^2$. It amounts to the following theorem: If p and q be one set of values of x and y in $y^2 = ax^2 + b$, and p' and q' the same or another set, then $qp' + pq'$ and $app' + qq'$ are values of x and y in $y^2 = ax^2 + b^2$. From this it is obvious that one solution of $y = ax^2 + 1$ may be made to give any number, and that if, taking b at pleasure, $y^2 = ax^2 + b^2$ can be solved so that x and y are divisible by b, then one preliminary solution of $y^2 = ax^2 + 1$ can be found. Another mode of trying for solutions is the combination of the preceding with the *Cuttaca*, as follows:—Let $y = q$, $x = p$, satisfy $y^2 = ax^2 + b$: then solve $pz + q = bw$, and

$$aw^2 + \frac{z^2 - a}{b} \text{ will} = \left(\frac{qz + ap}{b}\right)^2$$

and will be a square. It is then said that $y^2 = ax^2 - 1$ is impossible unless a be the sum of two squares; and some miscellaneous provisions are then given.

The chapter on simple equations requires no particular description; many of the examples are geometrical, as—Given the sides of a triangle to find the perpendicular. In the chapter on quadratic equations the well-known rules are given, and some cubic and biquadratic equations (special cases of course) are solved by completion of the cubes and squares. The two roots are mentioned, when positive, and it is said, 'people do not approve an absolute negative number,' on which the commentators speak as if the negative roots were seen, but not admitted. The property of the right-angled triangle is proved in a twofold way: first, by the similarity of the right-angled triangles formed by the perpendicular on the hypothenuse to the whole and to one another: next, by the method called Indian in the article HYPOTHENUSE. Various of the propositions in Euclid's second book are proved. In the chapter on equations of more than one unknown quantity questions both of the determinate and indeterminate kind are considered. In the next chapter are considered the equations $ax + bx^2 = y^2$; $(x + y)^2 + (x + y)^3 = 2(x^3 + y^3)$; $ax^4 - bx^2 = y^2$; $x - y = v^2$, $x^2 + y^2 = u^2$: 'in what period is the sum of a progression continued to a certain period tripled, its first term being three and the common difference two;' $ax^2 + by^2 = v^2$ and $ax^2 - by^2 + 1 = v^2$, $x^2 + y^2 = v^3$ and $x + y = u^2$; $x^2 + y^2 + xy = v^2$, and $xv + yv + 1 = w^2$;

$$\sqrt[3]{\left(\frac{xy + x}{2}\right)} + \sqrt{(x^2 + y^2)} + \sqrt{(x + y + 2)} + \sqrt{(x - y + 2)} + \sqrt{(y^2 - x^2 + 8)} = v^2;$$

$y + x + 3 = v^2$, $y - x + 3 = u^2$, $y^2 + x^2 - 4 = t^2$, $y^2 - x^2 + 12 = u^2$, $\frac{1}{2}xy - x = p^2$, and $v + w + t + u + p = s^2$; $x^2 + y^2 + 1 = t^2$, $x^2 - y^2 + 1 = u^2$, $x^2 + y^2 - 1 = v^2$ and $x^2 - y^2 - 1 = w^2$; $3x + 1 = v^2$ and $5x + 1 = u^2$, $3x + 1 = v^3$ and $3v^2 + 1 = u^2$; $2x^2 - 2y^2 + 3 = t^2$ and $3x^2 - 3y^2 + 3 = u^2$; $x^2 - a = by$; $x^3 - 6 = 5y$; $5x^2 + 3 = 16y$; $4x + 3y + 2 = xy$; $vwxy = 20(v + w + x + y)$; $x + y + x^2 + y^2 + xy = (23 - x - y)^2$; $4x + 3y + 2 = xy$, $2xy = 58 - 10x - 14y$.

Mr. Colebrooke has also given the algebra of Brahmegupta, being a chapter of the Brahme-sphuta-siddhanta. It contains the operations of algebra, barter, interest, progression, plane geometrical questions (the ratio of the circumference to the diameter is called 3 for practice, and $\sqrt{10}$ for more accuracy), and many of the more practical applications of arithmetic, as in the Liliwati. Also the *Cuttaca*, simple and quadratic equations, the indeterminate equation $y^2 = ax^2 + b$, and miscellaneous problems. The whole of this algebra is contained in Colebrooke's 'Algebra, with Arithmetic and Mensuration, from the Sanscrit of Brahmegupta and Bhascara,' London, 1817. Dr. John Taylor, in 1816, published at Bombay a translation of the Liliwati from the Persian, with an appendix on the mode in which arithmetic is now taught in Hindu schools; and (London, 1813) Mr. Edward Strachey published a great part of the Viga-Ganita, also from the Persian, with Mr. Davis's notes. It remains to mention that, by the extracts which were made from the Surya Siddhanta, it appears that the Hindu arithmetic of sines was more perfect than could be gathered from what is said of the mode of finding chords in the Liliwati. They had a table of sines calculated by the method of second differences for every 3¾° from 0° to 90°; and among their astronomical uses of this table is one which is equivalent to the equation $d(\sin a) = \cos a \, da$. (Delambre, *Astron. Anc.*, i. 45 The minimum of trigonometrical formulæ which Delambre allows them (and he never grants them more than the barest minimum) amounts to

$$\sin^2 x + \cos^2 x = 1, \ \sin 30^\circ = \tfrac{1}{2}, \ \sin 60^\circ = \tfrac{1}{2}\sqrt{3}$$
$$\sin^2 \tfrac{1}{2} A = \tfrac{1}{2}(1 - \cos A);$$

but how they were to find out a theorem equivalent to $\Delta^2 \sin x = -4 \sin^2 \frac{1}{2} \Delta x \sin x$, with only this amount of formulæ, he does not say.

The Mohammedans brought but a small part of this splendid body of algebra into Europe. The work of Mohammed-ben-Musa, which is sufficiently shown by Dr. Rosen in his translation to have had an Indian origin (and indeed no one now questions that origin), contains merely simple and quadratic equations of the determinate kind, applied to various questions connected with pecuniary transactions. The algebra of Diophantus is more Indian in its character, as it treats entirely of those problems which are therefore called *Diophantine*, namely, integer solutions of indeterminate equations. It is, to all appearance, a part of the Indian algebra, similar in its contents to some of the classes of problems which fill the two last chapters of the Viga Ganita, translated into that strict and consecutive mode of demonstration which the Greek mathematicians (fortunately for us) never dispensed with. But, while granting to the first European algebraist full credit for the superior completeness of his mode of exposition, every comparison confirms us more and more in the impression that the Hindu was his teacher: whether we consider the probable æra of the older Indian algebraists, or the contents of the book itself, it s difficult to come to any other conclusion. The extravagant mania of Bailly, and the reaction caused by the writings f Delambre, have left no medium opinion upon Hindu antiquity; and conclusions founded on the most sober views of istory, and the most usual modes of chronological reason- ng, have been entirely kept out of sight. In both our sus- icions with respect to antient intercourse between the two ations, namely, that the Indians received some astronomy etween the time of Hipparchus and Ptolemy, and communicated some algebra which was finally systematized by Diophantus, we think we derive some support from the eriod at which the Grecian kingdom of Bactria was in xistence. That principality was governed and partly olonized by Greeks at a time when the discoveries of Hipparchus must have been in the hands of Greek astro- omers, if of those of any country; and to put a difficulty n the way of Bactrian Greeks knowing of Hipparchus, is o put a much stronger one in the way of Hindus having he same information. Again, though it is possible that Hindus might have taught algebra to Greeks in Bactria, is impossible that the latter could have communicated to the former, since Bactria ceased to be a Grecian ngdom about 140 B.C.; and Diophantus, though his time not known, has never been supposed to have lived till wo or three centuries after the Christian æra. Granting, hich is likely enough, that Greeks remained in Bactria ter their government was overthrown by the Scythians, d that they retained the knowledge of Grecian arts; anting also that the descendants of these same Greeks came in time incorporated with the Hindu race after cramaditya had checked the advance of the Scythians, d established a government which was likely enough to ract the remaining Greeks of Bactria, and more particu- ly the learned among them—this, though a reasonable count of the transmission from Greece to India of the tronomy of Hipparchus, gives no clue whatever to that the algebra. Colebrooke's researches give a chain of ebraical writers who are cited, each by his successor, d who begin (even upon his cautious mode of estima- n) at the very time when Diophantus probably wrote; d to suppose anything like an immediate and direct ansmission of a Greek writing to India, and an imme- ate cultivation and extension of its results, is to start hypothesis which not only bears on the face of it the rpose which it is to serve, but pays far too high a ompliment to the natives of India, whether as recipients f the knowledge of others or as extenders of their own. here is one difficulty in the way of our own opinion as the algebra, and that not a small one: why did not the reeks, or the Greek, obtain the Indian principle of local lue in numeration at the same time as he learnt their gebra?

The modern state of science in India is generally re- rted, from Le Gentil downwards, to be at a low ebb. ery few persons, it is asserted, can even predict the time an eclipse; and still fewer understand the rules by hich it is done. In this, the assertion of Le Gentil, Davis, d Bentley, uncontradicted by Colebrooke, we should ve been disposed implicitly to rely, had it not been for a per published in our own day (*Mem. Asiatic Soc.*, vol. .) by Mr. Whish, of the Madras Civil Establishment, n the Hindu Quadrature of the Circle.' If any one ose name was not known to us had simply published is paper on his own authority, we should have had some spicion that it was neither more nor less than a clever ax; but it is published, with the Sanscrit at full length, the Memoirs of the Society which is best able to judge its contents.

The author begins by mentioning a work of Aryabhatta (the Aryabhatiyam, apparently unknown to Colebrooke), in which he mentions the epoch of his birth in a manner which places him at the period of Colebrooke's latest conjecture, namely, at the end of the fifth century. Here he gives the circumference of the circle at 3·1416 times its diameter. Mr. Whish then mentions three works:

1. The *Tantra Sangraha* of Talaculattura, who, by his own statement, that of his commentators, and the general consent of the learned in Malabar, wrote in A.D. 1608.

2. The *Carana Padhati*, by Pathumana Soma Yaji, whose grandson was (when the paper was written; it was read before the Society in 1832) alive in his seventieth year; written in 1733.

3. The *Sadratnamalah*, by Sancara Varma, younger brother of the rajah of Cadattanada, near Tellicherry (1832).

In the *Tantra Sangraha* it is stated that 104348 divided by 33215 is the circumference when the diameter is unity. This gives 3·1415926539, and is correct to the ninth decimal place inclusive. He adds the ratio of Metius, 355 to 113 [QUADRATURE], which, on the supposition of his having borrowed it from European books, found its way to India in less than half a century. Nothing so correct as his first statement existed in Europe before VIETA.

In the same work are (if we use the meaning of π now uniformly established) the following approximations:—

$$\frac{\pi}{4}=1-\frac{1}{3}+\frac{1}{5}-\ldots\ldots$$

$$\frac{\pi}{4}=1-\frac{1}{3}+-\ldots\pm\frac{1}{2x+1}\mp\frac{x}{4x^2+1}$$

$$\frac{\pi}{4}=1-\frac{1}{3}+\frac{1}{5}-\ldots\pm\frac{1}{2x-1}\mp\frac{x^2+1}{(4x^2+5)x}.$$

This last is very correct: three terms and the final correction give ·7853; six terms and the correction give ·785398. Then follows

$$\pi=\sqrt{12}.\ \left\{1-\frac{1}{3.3}+\frac{1}{5.3^2}+\frac{1}{7.3^3}-\ldots\right\}$$

$$\frac{\pi}{16}=\frac{1}{1^5+4.1}-\frac{1}{3^5+4.3}+\frac{1}{5^5+4.5}-\ldots.$$

$$\pi=3+4\left(\frac{1}{3^3-3}-\frac{1}{5^3-5}+\frac{1}{7^3-7}-\ldots.\right)$$

$$\frac{\pi}{4}=\frac{1}{2}+\frac{1}{2^2-1}-\frac{1}{4^2-1}+\ldots\pm\frac{1}{4x^2-1}\mp\frac{1}{8x^2-8x+6}$$

$$\frac{\pi}{8}=\frac{1}{2^2-1}+\frac{1}{6^2-1}+\frac{1}{10^2-1}+\ldots.$$

$$\frac{\pi}{8}=\frac{1}{2}-\left\{\frac{1}{4^2-1}+\frac{1}{8^2-1}+\frac{1}{12^2-1}+\ldots.\right\}$$

The *Carana Padhati*, besides some of the series already mentioned, gives

$$\frac{\pi}{6}=\frac{1}{2}+\frac{1}{(2.2^2-1)^2-2^2}+\frac{1}{(2.4^2-1)^2-4^2}+\ldots.$$

$$\frac{\text{arc}}{\text{rad}}=\tan-\frac{\tan^3}{3}+\frac{\tan^5}{5}-\ldots.$$

the tangent is not named, being called sine ÷ cosine.

The *Sadratnamalah* gives some series, and also 3·14159265358979324 for an approximation to π. This last work, being written in our own day, requires no remark; but it is rather a staggering assertion that works written in 1608 and 1733 give series which not only were not known in Europe at those periods, but must have been discovered by something answering to the integral calculus. On this point we must suspend our opinion till these works are published, with such an account of them as may command belief in their being the genuine productions of the time at which they profess to have been written: but if we grant them existence at all, they are enough to show that there has been, in Malabar at least, knowledge enough to enable the possessors to avail themselves of the results of modern European mathematics. Mr. Whish asserts that the invention of these infinite series originated in Malabar, and that they are not 'even to this day known to the eastward of the range of Ghauts which divides that country from the countries of Madura, Coimbatore, and Mysore.' This by itself seems to us to favour the presumption that they were introduced from Europe at a comparatively recent period. We rather suspect that Le Gentil, who was in the southern parts of the Deccan in 1769, and who used every means to ingratiate himself, that he might procure a knowledge of the native astronomical processes, in which, much against the will of the Brahmins, he succeeded by the aid of a Tamul Christian—may have been the communicator of several of these series, and that Catholic missionaries may have given the rest. All writers admit that the Hindus are apt to assign a greater antiquity to their methods and writings than really belongs to them, as indeed is evident enough from their astronomical periods. This desire on their part seems to have been met in Europe by a determination to deny their writings any antiquity whatever: it is forgotten that the mere desire to appear an exceedingly antient nation is itself a consequence of the feeling that there is already a considerable antiquity to boast of. The Chinese and Hindus, whose system has certainly lasted longer than that of any other countries with which we are acquainted, are precisely, of all the people on the face of the earth, those who most desire to have their knowledge of all kinds considered as more antient than it really can be shown to be.

VIGAN, LE. [GARD.]

VIGE'VANO. [MORTARA.]

VIGI'LIUS, a deacon of the church of Rome, happened to be at Constantinople when Theodora, wife of the emperor Justinian, determined to depose Pope Sylverius, who had incurred her displeasure for reasons not very clearly ascertained. Anastasius Bibliothecarius says that Sylverius had refused to reinstate in the see of Constantinople the patriarch Anthimus, who had been deposed through the influence of Pope Agapetus I., the predecessor of Sylverius, on the charge of heresy. A charge was brought against Sylverius of having held correspondence with the Goths, who were besieging Rome, A.D. 537; upon which Belisarius, who commanded in that city, arrested Sylverius, stripped him of his pontifical garments, and banished him to Patara in Asia Minor. Belisarius then, according to the instructions which he had received from Theodora, ordered the clergy of Rome to proceed to a new election, suggesting at the same time the deacon Vigilius, who had been intriguing with the court of Constantinople, as the fittest candidate. Vigilius was accordingly elected in November, 537, and he soon after repaired to Rome, where he was installed in his see through the influence of Belisarius. His election however was generally looked upon as having been forced and unlawful, and the historians of the Church consider him as an intruder as long as Sylverius lived. Vigilius is said by some to have agreed with Theodora to reject the Council of Chalcedon, and to receive into his communion Anthimus, Theodosius, bishop of Alexandria, and others who entertained Eutychian doctrines. Liberatus Diaconus and Pagi quote letters of Vigilius in proof of his connivance at these doctrines. It is also said that he paid a large sum of money to Theodora to obtain his election. In the year 538 Sylverius, who had been sent back to Italy by the emperor Justinian to be tried concerning his alleged treason, died: Procopius says that he was put to death by order of Antonina, the wife of Belisarius; others say that he was starved to death in the island of Ponza by order of Vigilius, who after his death remained undisputed possessor of the see of Rome. Vigilius has been since generally acknowledged as legitimate pope from the date of his predecessor's death. From that time also Vigilius showed himself less docile to the caprices of the court of Constantinople; he maintained the authority of the Council of Chalcedon, and he even incurred the displeasure of Justinian because he would not subscribe to the theological opinions of that emperor.

In the year 545 Vigilius left Rome for Sicily, from whence he sent supplies to Rome during the subsequent siege of that city by the Goths under Totilas. In the year 547 Vigilius repaired to Constantinople at the request of Justinian, who was warmly engaged in a theological controversy, which is known in Church history by the name of the 'three chapters.' Vigilius, after remaining at Constantinople for some years, was obliged to escape from the wrath of the emperor to Chalcedon, where he took refuge in a sanctuary, A.D. 552. In the following year Justinian convoked a general council at Constantinople, chiefly to decide upon the question of the 'three chapters,' or, in other words, to condemn certain controversial writings of three bishops of the preceding century, THEODORE of Mopsuestia, Ibas of Edessa, and THEODORETUS. Vigilius, who considered those writings to be orthodox, refused to condemn them, and for this he was banished, with other bishops of his own opinion, to the island of Proconnesus, from which he was recalled in 554, at the urgent entreaty of the clergy of Rome, supported by the intercession of Justinian's successful general Narses. Meantime the Council of Constantinople had condemned the 'three chapters,' and its decision was now sanctioned by Vigilius, after which Justinian permitted him to return to Italy. On his way to Rome by sea, Vigilius landed at Syracuse where he died of the stone, of which he had been suffering for some time, in the seventeenth year of his troubled pontificate. He was succeeded by Pelagius I.

(Muratori, *Annali d' Italia*, and the authorities therein quoted.)

VIGNO'LA, GIA'COMO BAROZZI, a very eminent Italian architect, and one of the greatest modern authorities in his art, was born in 1507, at Vignola, in the territory of Modena, whence he derives the name by which he is more generally mentioned than by his family appellation. Giacomo was the only child of his parents, and by the death of his father he was left at an early age entirely dependent upon his mother. Having manifested some taste for drawing, he was sent by her at a suitable age to Bologna to study painting, but he made so very little progress, that he determined to abandon it and apply himself to architecture, a study he had been led to by that of perspective, in which he had discovered principles and practical rules that in the then state of the science were eminently useful. He now set out for Rome in order to make himself acquainted with antient architecture by examining the various remains in that city; and afterwards he made a series of drawings of them for an academy or architectural society which was at the time just established under the auspices of several persons of rank. In the meantime, or previously to being so employed, he had supported himself by painting. What was the length of his first residence at Rome is not known, but it could hardly have been one of many years, because, about [illegible] he accompanied Primaticcio to France, where he remained two years, during which he made several models and designs for Francis I., none of which however were executed, owing to the unfavourable state of public affairs. The Château Chambord indeed has been erroneously attributed to him, but it was erected somewhat earlier, and is of a very different character from any of his works.

On returning to Italy he fixed himself for awhile at Bologna, where in competition with many others he made designs for the façade of San Petronio, in which he endeavoured to combine the antique, or rather the style founded upon its orders, with the Gothic of the original fabric; but, as not unfrequently happens under such circumstances, neither his nor any of the other designs were adopted, for the whole scheme fell to nothing. He was however employed upon various works in that city, and among them are the Casa Bocchi (no very favourable specimen of his taste, as he was obliged to comply with the whims of the proprietor), alterations of the Bank or 'Cambio,' the 'Naviglio,' or canal leading to Ferrara, and the Palazzo Isolani at Minerbio, at a short distance from Bologna. So poorly were his services for the work of the Naviglio recompensed, that on its being completed he took his leave of Bologna and went to Piacenza, where he designed the ducal palace, leaving however the building of it to his son Giacinto. It was perhaps about this period that he erected the church at Mazzano, the Madonna degli Angeli at Assisi, the chapel of San Francesco at Perugia, and other structures in various parts of Italy, the precise dates of which are unknown. During the pontificate of Julius III. (1550-6) he was introduced by his friend Giorgio Vasasi to that pope, who had known him while legate at Bologna, and who appointed him his architect. Besides the direction of the Trevi aqueduct, his new patron employed him almost immediately on the villa for himself called 'La Papa Giulio,' or 'Villa Giulia.' This last has always been regarded as a superior piece of architecture, and it forms the subject of a splendid atlas volume, published by the architect Stern, in 1788; nevertheless it is difficult to account for its celebrity, there being little to admire, or that is striking, except the picturesque arrangement and effect of the inner cortile and its semicircular loggia: it is besides a mere 'casino,' both small and in-commodious as a house. The same work also contains plans, &c. of the small church of S. Andrea, near Ponte Molle at Rome, another highly esteemed production of Vignola's, but which also has been greatly overrated: at the best its merits are of a negative kind, because though taken by themselves the individual parts and their mere proportions are correct, they have no particular character, and the composition is anything but masterly, or in accordance with the spirit and system of the antique. The heavy double attic causes the order to appear insignificant and the pediment unmeaning. In such cases however the established reputation of a work generally silences criticism, and deters from nice examination into merits which may safely be taken upon trust; accordingly Stern speaks of this building in very encomiastic terms, as does likewise De Quincy. After the death of Julius, Vignola found a liberal patron in his nephew the Cardinal Alexander Farnese, for whom he erected his chef d'œuvre, the celebrated palace at Caprarola, a magnificent edifice of very peculiar character, it being a mixture of military and civil architecture, pentagonal in plan, and presenting a lofty mass reared upon an equally lofty substructure of terraces of the same form. Yet, although sufficiently stately, there is also something both lumpish and monotonous in its general outline. Within is a circular cortile with open galleries or arcades, with which all the principal rooms immediately communicate, and but for which they would be merely thoroughfares to each other. The magnificence of the interior consisted chiefly in the frescoes and other paintings with which the walls and ceilings of the apartments were decorated, and of which a very circumstantial account has been given by Vasari in his Life of Taddeo Zucchero, the principal artist employed upon them. Philip II., on the part of whom he had been consulted relative to the designs for the Escurial, would willingly have engaged Barozzi in his immediate service, but the architect excused himself on the score of advanced age and infirmity, and his having also undertaken the superintendence of the works at St. Peter's, on the death of Michael Angelo (1564). He therefore remained at Rome, where he died, July 7th, 1573.

What has mainly tended to confer on Vignola the celebrity he enjoys throughout Europe is his 'Treatise on the Five Orders,' which has been received as an authority in regard to them; but though it has been of service to the profession, it has done injury to the art, it being impossible to say what variety might have been produced in regard to 'orders' had architects been left to treat them as freely as other parts of design, instead of tying themselves down to fixed rules, which after all are of little use, inasmuch as they do not secure any further merit. Of Vignola's own designs, &c. the best collection is that entitled 'Œuvres Complètes de J. B. de Vignola, publiées par H. Lebas et F. Debret,' in large folio, and in outline, Paris, 1823, &c.

(Milizia, *Vite*; Quatremère de Quincy, *Célèbres Architectes*; Vasari.)

VIGNOLES, ALPHONSE DES, was descended from a Protestant family of great antiquity in Languedoc, where he was born, at the château of Aubais, 29th October, 1649. He had been designed by his father for the military profession, but preferring the church, he went through the usual studies, first at Geneva, and then at Saumur, after which he spent some time in England. Returning home in 1675, he became minister at Aubais, and after some time at Calais, where he remained till the revocation of the Edict of Nantes in 1685. He then retired to Geneva, whence after a time he removed to a church in Berlin, and then to that of Brandenburg; but when the Royal Society of Berlin was founded in 1701, being chosen one of the first members, and invited on the suggestion of Leibnitz to take up his residence in that city, he returned thither, and being appointed minister of the neighbouring church of Copenick, he remained there till his death, at the age of ninety-four, on the 24th of July, 1744. Des Vignoles is the author of many papers in the 'Memoirs of the Royal Society of Berlin,' and in the periodical journal called the 'Bibliothèque Germanique,' of which he became one of the editors in 1711; but his principal work is his 'Chronologie de l'Histoire Sainte et des Histoires Etrangères depuis la sortie d'Egypte jusqu'à la Captivité de Babylone,' which appeared in 2 vols. 4to., at Berlin, in 1738. Chronology was the study to which he had chiefly devoted his attention.

VIGO, a seaport town of Spain, in the province of Galicia, is situated at the extremity of a bay of the Atlantic, in 42° 14′ N. lat. and 8° 43′ W. long., about 12 miles north-west of Tuy. The town, which is supposed to be the antient Vicus Spacorum, is built on the declivity of a steep hill, on the summit of which there are two old castles, called San Sebastian and Castro. Vigo is celebrated for its magnificent bay, one of the finest in the world in point of security and extent. In 1587 Sir Francis Drake forced his way into it and took the town, which he plundered. In 1702 the combined Dutch and English fleets, which lay in wait for the Spanish galleons returning from America, succeeded in capturing some and sinking others within the bay. The town was again taken by the English in 1789, but was shortly afterwards evacuated. Very little trade is now carried on at Vigo, which is frequented only by few foreign vessels, except the steam-packets of the Peninsular Navigation Company, which touch weekly there on their passage to Cadiz. The population, according to Miñano, did not exceed 6000 in 1836.

VIGORS, NICHOLAS AYLWARD, was born in 1787, at Old Leighlin, in the county of Carlow, where his family had long lived. He received his early education at home, and afterwards became a student at Trinity College in the University of Oxford, where he gave considerable proof of his classical and literary acquirements, by the publication, in 1810, of 'An Enquiry into the Nature and Extent of Poetic Licence.' In the year 1809 he had an ensigncy purchased for him in the Grenadier Guards, and was present at the action of Barrosa, in the early part of 1811, where he got severely wounded. On his return to England he quitted the army, and devoted himself to the study of zoology, especially of birds and insects. In both these subjects he acquired great knowledge, and formed extensive collections, which he at a subsequent period presented to the museum of the Zoological Society. On the death of his father he succeeded to the family estate, and, in 1832, became the representative in parliament of the borough of Carlow, for which and for the county of Carlow he continued to sit until the termination of his life, on the 26th of October, 1840.

Although Mr. Vigors has written no work devoted to the subject of zoology, he has contributed a large number of valuable papers to the 'Transactions' of the Linnæan Society and of the Zoological Society, and the pages of the 'Zoological Journal.' He was an advocate of the circular or quinary system of arrangement as propounded by Mr. W. S. Macleay, in his 'Horæ Entomologicæ;' and the two papers for which he is best known, the one 'On the Natural Affinities that connect the Orders and Families of Birds,' and the other, 'On the Arrangement of the Genera of Birds,' are devoted to the application of this system to ornithology. He was one of the founders of the Zoological Club of the Linnæan Society, from which sprung the Zoological Society, of which society he was the first secretary, and through the whole of his life he devoted much of his time and talents to its interests. In his papers he did not confine himself to one department of zoology, but there are many in the 'Zoological Journal' and 'Proceedings of the Zoological Society' that attest his acquirements in the whole range of zoology. He died suddenly, in the midst of a useful career, and has left among those who knew him a lively sense of his worth as a friend and of his talents as a man of science.

(*Proceedings of Linnæan Society*, May, 1841.)

VIJA GAṆITA. [Viga Ganita.]

VIJI ISLANDS is the name of an extensive group of islands in the Pacific Ocean, which on our maps are called Fidji or Feedjee Islands. None of the larger groups of islands is less known than these, partly because they are situated out of the common track of vessels and in a dangerous part of the ocean, and partly on account of the great extent of the group. They lie between 15° 5′ and 19° S. lat. and between 177° and 182° E. long., and consist properly of three groups. The most eastern contains a great number of small islands, and one of considerable size, the island of Lakemba. Farther to the west there is a more extensive group, containing several islands of moderate size, and a large one, Viji-levu, or Great Viji. We are not well acquainted with its extent, but Captain Bethune found in it a river, which he surveyed for thirty miles upwards, and which at that distance from the sea was 250 yards wide and 12 feet deep: so far also the tide was perceptible. The third group lies to the north of the Viji-levu, and contains the large island of Pau or Tarkanava, with several smaller ones. Several good harbours have been visited by Europeans; the best are at Rewa, on the southern shores of Viji-levu, and at Libuka, on the island of Ovalan, west of Viji-levu.

These islands seem to be of volcanic origin, though no active volcano has been observed, and they exhibit that irregularity of surface which is peculiar to islands of that formation. Many of them rise to a considerable elevation, which however has not been determined. The climate is hot, but not so constant as it generally is between the tropics, because this group is situated on the southern limit of the trade-winds, where the changes in the temperature are frequent and sudden. In August and September the thermometer on board the vessel varied between 72° and 88°. The domestic animals are pigs and dogs, and the wild animals are rats. There are few kinds of birds; the most common are parrots. Besides the ordinary objects of agriculture in the neighbouring islands, cocoa-nut palms, bread-fruit trees, bananas, yams, sugar-cane, and sago, Captain Bethune states that rice is very extensively cultivated near Rewa, and he also mentions maize. As these two kinds of grain are not grown in any of the groups which surround the Viji Islands, we are at a loss to account for their cultivation on Viji-levu. There are many timber-trees in the forests, which cover the more elevated parts of the island, and the inhabitants of the Friendly Islands get the best of their large boats from these islands.

The population is stated to amount to 200,000 individuals. In the structure of their bodies the inhabitants resemble those of the Friendly Islands, and there is no great difference in their languages: they evince a considerable degree of inventive power and ingenuity in the construction of their boats and houses, and in making arms, clothes, wicker-work, and earthenware. They have three kinds of boats: the largest, consisting of two boats united, are sometimes 50 feet long, and are used to make voyages which last several days. Many of them are made for sale in the neighbouring islands. In Rewa is a large manufacture of earthenware, which is made with great taste, and is also an article of export to the neighbouring islands. It is rather strange that people who evidently have made considerable progress in civilization are still cannibals. Captain Bethune thinks that it is done to satisfy their desire of revenge, but the missionaries state that they find that human flesh is more agreeable than that of animals. They state that sometimes banquets are given, at which fifty human beings are slaughtered; and add, that they frequently make war on one another for the purpose of procuring prisoners, who are slaughtered. In the last few years some Wesleyan missionaries have established themselves on the islands. In 1835 two of them passed from the Friendly Islands to Lakemba, and two years afterwards one of them went to Rewa; but up to the time of Captain Bethune's visit (September, 1838) their labours had produced little effect.

These islands are sometimes visited by American vessels. They get there sandal-wood, tortoise-shell, and trepang for the Chinese markets. Sandal-wood was some years ago very abundant on the northern islands, but it is stated that it has lately become scarce. Only a small quantity of tortoise-shell can be obtained, but a great quantity of trepang is collected on the banks near the islands. The Americans bring guns, gunpowder, cochineal, cotton stuffs, and iron-ware. The inhabitants of the Friendly Islands pay for the large boats with *topa*, or stuffs made from the bark of the Chinese mulberry-tree, and the teeth of the *physeter macrocephalus*.

The Viji Islands were discovered by Tasman in 1643, but from that time were not visited until 1789, when Captain Bligh, after the mutiny of his crew, sailed through the most eastern group, and in 1792 he discovered the islands farther to the west. In 1797 they were visited by Captain Wilson in the Duff, and since that time occasionally by other vessels.

(Mariner's *Account of the Natives of the Tonga Islands*; Krusenstern's *Atlas de l'Océan Pacifique, et Mémoires*; Captain Drinkwater Bethune, *Account of the Viji Islands*, in *Nautical Magazine*, 1839.)

VILAINE (River). [FRANCE; ILLE ET VILAINE.]

VILLA DE LEON. [MEXICAN STATES.]

VILLA FRANCA. [NICE.]

VILLA FRANCA DE PIEMONTE. [PIGNEROL.]

VILLA HERMO'SA. [MEXICAN STATES.]

VILLACIDRO. [SARDEGNA.]

VILLACH, a Circle of the government of Laybach in the kingdom of Illyria, is about 2000 square miles in extent, and has 125,000 inhabitants, the majority of whom are Germans and Roman Catholics, the minority are Lutherans. The Wends (or Vandals), who are but few in number, are all Roman Catholics. The circle is very mountainous, and more adapted to pasturage than agriculture. The forests are extensive. The river Drave, which comes in from Tyrol, is joined on the right by the Geul, and on the left by the Moll and the Liser. Game and fish are in abundance; the mineral products are gold, silver, lead, iron, quicksilver, antimony, and marble. [BLEIBERG.]

VILLACH, the capital of the Circle, is very delightfully situated on the Drave, at its confluence with the Geul, in 46° 35′ N. lat., and 13° 17′ E. long., in a deep mountain-valley, which some call the Switzerland of Inner Austria. The town, which was formerly much larger than it now is (perhaps the *Julium Carnicum*, *Colonia Julia*, or *Forum Vibii* of the Romans), is surrounded with an antient wall, and with the two suburbs has about 2500 inhabitants. There are two Roman Catholic churches, of which the Gothic cathedral is worthy of notice, on account of the numerous very antient tombstones on the pavement and its pulpit of white marble. The inhabitants have a manufactory of white-lead, one of litharge, red-lead, yellow-lead, and varnish, and in the neighbourhood several iron-works. Villach was formerly the staple place of the Italian trade, where Italy exchanged its rich productions for those of Germany. It has still a considerable trade in iron and lead, and a carrying-trade between Italy and Germany.

(Jenny, *Handbuch für Reisende in dem Oesterreichischen Kaiserstaate*; *Die Oesterreichische National Encyclopädie*; Blumenbach, *Gemälde der Oesterreichischen Monarchie*, in Schütz, *Allgemeine Erdkunde*, vol. xiv.)

VILLA'NI, GIOVANNI, born at Florence in the latter part of the 13th century, was a merchant by profession, and travelled in various countries in the pursuit of business. He also filled several offices in the service of the republic of Florence, was repeatedly one of the priors or executive council, and was employed in negotiating the peace with Lucca and Pisa in 1317. He afterwards served in the Florentine army in the war against Castruccio Castracani, after whose death, in 1328, he negotiated the peace with Lucca. He was involved in the bankruptcy of the mercantile company of the Bardi in 1345, by which he was a great loser, and he was even imprisoned in consequence of it as an insolvent. He died of the plague in 1348. Villani wrote the history of his country in twelve books, from the building of Florence to the time of the author's death. He does not however confine himself to the history of Florence, but he relates also the occurrences of other countries, both of Italy and out of Italy, so as to retain the character of a general chronicle. In the earlier period of his narrative he exhibits considerable credulity, and a want of critical skill, but as he draws near to his own times, he can be more depended upon for correctness of facts and impartiality. Villani, though belonging to the Guelph party, appears to have been, as a writer, comparatively free from party spirit. His style is remarkably clear; his language is the pure Florentine of his age, some of the expressions of which however are now become antiquated. Villani is liable to the charge of plagiarism, for he has copied in great part the older chronicle of Ricordano Malespini, without once mentioning him, which chronicle, including the continuation by Giacotto Malespini, comes down as far as the year 1286. From this epoch however, to that of Villani's death, 1348, Villani's history is original. The work appears to have lain forgotten for nearly two centuries, until it was first printed at Venice in 1537. Machiavelli quotes Villani once at the beginning of the second book of his 'Storie Fiorentine,' but he does not seem to have followed or consulted him in his narrative, and the other historians anterior to Machiavelli do not mention Villani's work. It is worthy of remark that the chronicle of Dino Compagni, also a writer of the fourteenth century, whose interesting narrative embraces part of the period of that of Villani, remained unedited till the eighteenth century, when Muratori published it in his great collection.

The first ten books of Villani's history were published at Venice in 1537, and the eleventh and twelfth books were afterwards published at Florence in 1554, under the title, 'La Seconda Parte della Cronica Universale de' suoi Tempi, di Giovanni Villani, Cittadino Fiorentino.' In 1587 Baccio Valori published a new and more correct edition of the whole at Florence, and dedicated it to Francesco de' Medici: 'Istoria di Giovanni Villani, Cittadino Fiorentino, nuovamente corretta, e alla sua vera lezione ridotta.' This is the edition which is quoted by the academy of La Crusca as a 'Testo di Lingua,' or a book of authority in matters of language.

Matteo Villani, brother of Giovanni, wrote, after his brother's death, a continuation of his history, and brought it down to the year 1563, in which he died. His veracity has been praised by Muratori, but his style is inferior to that of his brother. Lastly, Filippo Villani, Matteo's son, added a continuation to his father's narrative, including the years 1363-4. The whole body of history by the three Villani was published together by Muratori, and has been reprinted several times since.

Filippo Villani was also a Latin writer; he wrote, 'De Origine Civitatis Florentiæ et ejusdem famosis Civibus.' The first part of the work, which treats of the origin of Florence, is full of fables, and it has never been printed. Of the second part, which contains short biographies of distinguished men of Florence, detached biographies in the original text have been published in the Life of Ambrosius Camaldulensis, by Mehus, who discovered the MS., and some others by Sarti; Moreni published those of Dante, Petrarch, and Boccaccio, under the title, 'Philippi Villani Vitæ Dantis, Petrarchæ, et Boccacii,' Florence, 1826. Mazzuchelli published an old Italian version of the Lives of Filippo Villani by an anonymous translator, before the discovery of the Latin text: 'Le Vite d' Uomini illustri Fiorentini, scritte da Filippo Villani, colle Annotazioni del Conte Mazzuchelli,' 1747.

Filippo Villani wrote also a work 'De Origine Regum Francorum,' which we believe is still inedited. He died about 1404.

Giovanni Villani, the Florentine historian, must not be confounded with another Giovanni Villani, who wrote chronicles of the town of Naples, and also of the kingdom of Sicily, which are of no great value.

(Tiraboschi, *Storia della Letteratura Italiana*; Corniani, *Secoli della Letteratura Italiana*; Gamba, *Serie dei Testi di Lingua.*)

VILLARET, CLAUDE, was born at Paris about the year 1715, or soon after, and was educated for the bar; but a love of light literature and worse levities disinclining him for that or any other laborious profession, he took to writing books, and produced, in 1745, a romance, entitled 'Histoire du Cœur Humain, ou Mémoires du Marquis de ——;' besides a one act play, entitled 'Quartier d'Hiver,' in which he was assisted by two other writers; and some other things of the same kind, said to be all of little value. It is not certain however that he was really the author of all the pieces that have been attributed to him. In 1748 his embarrassments forced him to leave Paris, upon which he joined a company of provincial players, being smitten, it is said, by the charms of one of the females. He now took the name of Dorval, and made his first appearance at Rouen, in the character of a lover; but he soon rose to a higher range of parts, and at length became manager of a company, which performed at Liège. He left the stage however in 1756. In 1758 he published anonymously at Geneva an answer to Rousseau's 'Lettre sur les Spectacles,' under the title of 'Considérations sur l'Art du Théâtre,' which is said to have been the best that appeared next to that by D'Alembert. This was followed, in 1759, by a volume, also anonymous, of selections from Voltaire, which he called 'Esprit de Voltaire,' and which was well received. In 1760 he returned to Paris with some literary reputation, and his friends got him the office of first clerk to the Chamber of Accounts (Premier Commis à la Chambre des Comptes), an appointment which led him to the study of the national historians of the middle ages; so that when the booksellers Desaint and Saillant were looking out for a writer to continue the 'Histoire de France,' commenced by the Abbé Velly, recently dead, they were induced to select Villaret. He conducted or compiled and wrote the work, from the 226th page of the 8th volume to the 348th page of the 17th, being the portion extending from 1329, the second year of Philip de Valois, to 1469, the 9th year of Louis XI. Villaret's first volumes are said to have so greatly extended the sale of the work, that the publishers raised the salary of their new editor to triple what they had paid to his predecessor; but as this would have made his remuneration not less than 4500 livres per volume, the statement is regarded by the writer of his life in the 'Biographie Universelle' as more than doubtful. This writer considers Villaret's to be the best written portion of the work, and intimates that it has been generally so esteemed by the public. The Abbé de Castres, on the contrary (in his 'Trois Siècles de la Littérature Françoise,' iv. 436), describes Villaret as being to his predecessor what Seneca is to Cicero; and asserts that he wanted the art of skilfully weaving his researches into the substance of his narrative—'il n'a pas eu, comme son modèle, l'art de fondre avec adresse ses recherches dans la narration.' Villaret also held the office, made for him, of secretary to the dukes and peers (Secretaire des Ducs et Pairs); and he is said, in the latter part of his life, to have been concerned in one or two other literary undertakings of the day. He died in February, 1766. His successor in the compilation of the 'Histoire de France' was the Abbé Garnier.

VILLARS, LOUIS HECTOR, a maréchal of France, and one of its most illustrious soldiers, was born at Moulins in 1653. He studied at the college of Juilly, and was, on quitting that seminary, enrolled among the 'pages de la grande écurie.' During an excursion of the court to Flanders, Villars obtained leave to visit Holland, and he afterwards accompanied his relation, St. Géran, envoy to the elector of Brandenburg, to Berlin. On his return to France he served in Holland as a volunteer in the corps commanded by Louis XIV. in person. The spirit of enterprise and observation beyond his years which had spurred him to visit foreign countries, he carried into the camp. The king, who had formerly distinguished him among the other pages on account of his fine figure, remarked one day, 'A single shot can't be fired without this boy starting from the ground to witness it.' Villars's courage and activity, and perhaps his fine figure, obtained for him, although his family was out of favour at court, a troop of horse at the age of nineteen.

The next two years he served in Germany under Turenne, who entertained a high opinion of his talents as a partisan. The Prince of Condé also distinguished him from the crowd of young officers. The mingled good sense and gallantry which he showed at the battle of Sénef procured for him a regiment of cavalry in 1674, before he had completed his twenty-first year. From 1674 till the peace of Nimwegen in 1678, Villars served in Flanders under the Maréchal de Luxembourg, and in Alsatia under the Maréchal de Crequi. The minister Louvois, who had quarrelled with the Maréchal de Bellefonds, Villars's uncle, extended his inveterate enmity to the whole family. The young soldier felt that he had nothing but himself to rely upon; and he appeared to multiply himself in his search of opportunities of distinction.

The next ten years of the life of Villars were spent principally in diplomatic employments. On his return to court after the peace of 1678, he gave the rein to his amorous propensities, to an extent which attracted general attention, and occasioned much disturbance. He was ordered to rejoin his regiment, but any fear of having lost the king's favour was soon dispelled by his being sent to Vienna to condole with Leopold I. on the death of the empress-mother. At Vienna he gained such an influence over the mind of the elector of Bavaria, that he detached him from the Austrian interest and rendered him subservient to the views of France. With the approbation of Louis, Villars accompanied the elector on his return to Munich, and followed him into Hungary, when he assumed the command of the Bavarian contingent in the imperial army levied against the Turks. Here, as usual, Villars distinguished himself by his impetuous but not uncalculating valour. On his return to Munich he found a new Austrian emissary opposed to him—the beautiful and voluptuous countess of Kaunitz. The first use made by this lady of the complete ascendency which she soon gained over the elector was to insist that Villars should be removed from the court. Notwithstanding this partial failure, Louis was satisfied with his ambassador's conduct. Villars was admitted to private interviews; Madame Maintenon received him at St. Cyr. At last Louvois relented, and in 1688, on the eve of the war occasioned by the league of Augsburg, conferred upon him the appointment of commissary-general of the cavalry.

Villars was sent to Munich to attempt to regain his influence over the elector and detach him from the alliance of Austria. In this he failed, and his life was even in danger from the Austrian party in Bavaria. He was next appointed to command the cavalry of the Maréchal d'Humières, whose army was stationed in Flanders with orders to act on the defensive. Villars, tired of this inactivity, resumed his old occupation of partisan, and levied contributions as far as Brussels. In 1689 he was created maréchal-de-camp. During the two following years he commanded a body of 15,000 men, which formed a reserve to the army of the Maréchal de Luxembourg. He was subsequently sent to the Rhine to assist with his counsels the Maréchal de Joyeuse, who was hard pressed by the Prince of Baden. In this service he continued till repose was for a short time restored to Europe by the peace of Ryswick in 1697.

The intrigues which preceded the Spanish War of Succession were now in full vigour. In 1699 Villars was entrusted with the delicate mission of ambassador-extraordinary to Vienna. He spent three years at that court, at the time when it and the court of Versailles were incessantly busied by every means short of actual war to thwart each other's views upon the throne of Spain. Villars, with a sleepless patience, strangely contrasting with his impetuosity in war, watched and unravelled all the tortuous intrigues of the Austrian court. He kept Louis and his ministers informed of every movement of Austria, and by blunt and opportune applications more than once deterred the emperor from steps which would have promoted his views. The personal animosity felt by the Austrian court to Villars was extreme; he was personally insulted, attempts were made to implicate him in the rebellious movements of Hungary, and his life was threatened. The courtiers affected to shun him; Prince Eugene alone continued on a footing of unreserved friendly intercourse. Villars persevered, and though more of the honour of insuring the accession of Louis's grandson to the Spanish throne was attributed to others than he felt to be consistent with a due sense of his services, even Louis XIV. was satisfied with his conduct.

On the commencement of hostilities in 1701 Villars was sent to the army commanded by Villeroi in Italy. Dissatisfied with his general, he obtained his recall. On his return to Paris he married Mademoiselle de Varangeville, to whom he was passionately attached. On the appointment of Catinat to the army of Germany, Villars joined him, but it is alleged that he found the genius of his commander enfeebled by age. In 1702 Villars was sent, at the head of thirty battalions, forty squadrons, and thirty pieces of artillery, to disengage the elector of Bavaria, who was surrounded on all sides by the Austrian troops. Villars had now attained his forty-ninth year, and this was the first time he had commanded in chief.

The events of Villars's campaign in Germany in 1703 are faithfully and instructively portrayed in his correspondence with the elector, Louis XIV., and his minister-at-war, and the letters of the general officers under his command, published at Amsterdam in 1762. The French general was everywhere successful, but the imbecility of the elector of Bavaria neutralized all his victories. Disgusted with his position, Villars petitioned to be recalled, and by his importunity wrung from the king a reluctant permission. On his return to France, it was proposed to send him to Italy, but the duke de Vendôme was his senior maréchal, and in his connection with the elector of Bavaria Villars had enough of military partnership with a prince of the royal blood. Louis forbore to insist upon his undertaking the Italian campaign, for there was a more important charge to intrust to him.

This charge was to terminate the war of the Cevennes. With the sanction of the king, he repaired to the scene of action, resolved to put an end to the troubles less by rigour than by gentler methods. In Lamoignon, the intendant of the province, he found a coadjutor participating in his sentiments, master of the necessary local information, and prompt in action. Together these associates pursued the Camisards into their most secluded retreats. A few examples of severity to those who resisted were followed by the extension of lenity, and even concessions to their religious scruples, to all who laid down their arms. Cavalier, the ablest leader of the Camisards, was gained by the humanity and soldierly frankness of Villars. Peace was on the eve of being restored to the province, when emissaries of England and Savoy rekindled the dissensions. The insincerity of the court co-operated with foreign intrigue, but the watchfulness of Villars cut off all assistance from beyond the frontier, and the insurgents of the Cevennes ceased to be dangerous. Villars saved his king, at the moment when he had all Europe on his arms, from the additional embarrassment of a civil war. He was received with the highest honours on his return to Versailles.

From the spring of 1705, till the conclusion of the peace of Rastadt in 1714, the life of Villars was a succession of campaigns. Sent by the king in the former year to inspect and strengthen the defences of the eastern frontier he took post on the heights near Fronsberg, where he covered Thionville, was in a position to succour Luxembourg if necessary, and, by means of the fortified posts of Bouzonville and Bourgaiche, kept open the communication with Sarre-Louis. Confident in the strength of his position, he did not entrench it, lest he should make his soldiers apprehensive. Marlborough appeared before the camp, at the head of 110,000 men; he examined its points for four days, and then retired. This encampment, more generally known by the name of Sirek than Fronsberg, astonished everybody. The prompt decision and fearlessness of Villars were well known, but the skill shown in selecting a strategic position, and the self-control evinced in keeping on the defensive, were unexpected. The moment the enemy retired, he gave vent to his natural impetuosity by resuming the offensive; he burst into Alsace, forced the lines of Weissenburg, presented himself before Lauterburg, and, to conceal the weakness which prevented him laying siege to that place, crossed the Rhine between Fort Louis and Strasbourg, and laying the whole country between the river and the Schwarzwald under contribution, closed the campaign of 1705. In 1706 he took Lauterburg and Hagenau, in the latter of which the enemy kept his reserves of artillery and stores. This success was neutralized by Villars's loss of the battle of Ramillies in Flanders, and the minister Chamillard's withdrawing some of his best troops. In 1707 Villars crossed the Rhine; forced the lines of Stollhofen on the 22nd of May; established his head-quarters at Rastadt on the evening of the same day, and the next occupied Stuttgard. He invited Charles XII. of Sweden, who had invaded Saxony, to make a junction with his army under the walls of Nürnberg, and concentrate their forces against Austria, but the invitation was declined. Troops were again withdrawn from him, and he was obliged to re-cross the Rhine. In 1708 he was sent to command on the frontier of Savoy, but the tardiness of those to whom the arrangements were intrusted caused the campaign to terminate without effect. In 1709 he was sent to re-organize the dispirited and demoralized army of Flanders. At the battle of Malplaquet he was wounded early in the day: he endeavoured to continue to direct the troops from a litter, but fainted and was borne from the field. His wound was dangerous and kept him inactive the rest of the year. The campaign of 1710 was desultory: repeated attempts were made to open negotiations. In the autumn of that year Villars's wound broke open, and he was obliged to resign for a time the command of the army. In 1711 the exhausted state of French finances hampered the military operations and kept Villars on the defensive within the frontier. In 1712 the battle of Denain (24th July), the capture of Marchiennes, Douai, and a number of forts by Villars, restored courage to the French. Prince Eugene was obliged to give ground, and retire beneath the walls of Brussels. The peace of Utrecht was concluded (separately) by Holland and England in 1713. Austria refused to sign the treaty. Villars was sent into Germany at the head of an army, and on the 7th of March, 1714, the peace of Rastadt was concluded.

The military labours of Villars were now to experience a long intermission, and only to be renewed when he approached the termination of his career. From 1714 to 1732 he was exclusively engaged in the turmoil of state intrigue. He had set off to visit his government of Provence, when he was recalled to witness the last moments of Louis XIV. Villars stood on delicate ground with the regent. In concluding the treaty of Rastadt he had made two secret stipulations: that the right of succession to the French throne, to the exclusion of the Duke of Orleans, should be reserved to Philip V. and his descendants. The regent was pacified however by Villars's producing the autograph commands of Louis XIV. to insist upon those conditions. Villars was appointed by the Duke a member of his council, in which he steadily opposed every deviation from the policy of his old master. In particular he laboured to prevent the adoption of the course proposed by Dubois, under the name of the quadruple alliance. He opposed energetically the adoption of the financial schemes of Law. Dubois advised the regent to have Villars arrested, and attempted to implicate him in the conspiracy of Alberoni, but the maréchal, by serving the regent with the same entire devotion as he had served Louis XIV., gained his confidence, and the affection entertained for him by the young king was an additional protection. After the death of Dubois the regent reserved to himself the office of prime minister, and regulated his conduct in a great measure by the advice of Villars in military and foreign affairs. The Duke of Bourbon, who succeeded the regent, showed no less confidence in him. His only rival was the Abbé Fleury. The marriage of Louis XV. with the daughter of the king of Poland appeared for a time to strengthen the influence of Villars, but the Abbé Fleury having undermined the queen's power with the king, the maréchal was obliged to give way to the favourite. This continued till 1732, when the rupture with Austria on account of the Spanish possessions in Italy rendered the military services of Villars indispensable. In his eighty-first year he was sent to command in Italy with the rank of maréchal-général de la France, which had never been conferred on any one before him, except Turenne. In the campaigns of 1733 and 1734 he evinced all the ardour, activity, and contempt of danger which characterised his youth. The ingratitude of the king of Sardinia however decided Villars to solicit his recall early in the course of the second. His wish was granted. He was taken ill at Turin on his way to France, and died on the 17th of June, 1734.

The predominant features of Villars's character were humanity, sincerity, quickness of apprehension, and promptitude without precipitancy in action. He was not free from the lax gallantry of his day, and is said, with or without cause, to have been extremely jealous of his wife. In advanced life he evinced a degree of avarice, contracted probably from the habits of economy forced upon him by the circumstances of his youth. He is among the most brilliant military characters of France, yet without that restless desire of show which detracts from the merits of many of them. He was capable of deep. disinterested, and lasting attachment. His conduct in the war of the Cevennes will ever endear his memory to the lover of humanity and of religious liberty.

VILLARS, DOMINIQUE, botanist, was born in a hamlet of the village of Noyer in Dauphiné. His father taught him reading and writing, and he learned Latin and geometry of the parish priest. When he was only fourteen years old his father died, and being the eldest in the family, at that early age he was obliged to superintend the duties of the farm on which his family lived. He was also appointed to his father's post of parish registrar, and in order to fit himself for his duties, he received instruction from a notary, in whose library he met with books on natural history, which so engaged his attention, that he determined to pursue the study of botany and medicine at his leisure. This led his mother to fear that he would neglect his agricultural pursuits, and accordingly at the age of seventeen she persuaded him to marry, in the hope that this would be a check to his pursuit of science. But in this she was disappointed, for in 1765 Villars made an excursion through Lyonnais, Bourgogne, La Franche-Comté, and Bresse, and collected many plants, and otherwise added to his knowledge of natural history. He afterwards became known to the Abbé Chaix, a good botanist, with whom he made many excursions in the mountains of Gapencois. He thus became acquainted with M. de Marchéval of Grenoble, and in 1771 proceeded to the military hospital of Grenoble for the purpose of studying medicine. Here his botanical knowledge soon brought him into notice, and in 1773 he gave a course of lectures on botany to the pupils of the hospital. From this period to 1776 he made several excursions in Bas Dauphiné, Provence, Languedoc, and La Grande Chartreuse, for the purpose of studying the natural history, more particularly the botany, of these districts. In 1777 he visited Paris, where his reputation as a botanist secured him a very flattering reception. In 1778 he took his degree as doctor of medicine, and would have returned to Noyer to practise medicine, but his friend M. Marchéval secured him an increase of stipend for his lectures at Grenoble, and in 1782 he was appointed physician to the hospital: he continued in this position till the suppression of the hospital by the French government in 1803. As this was unexpected, he remained for some time in considerable difficulties, but in 1805 he was appointed professor of botany and medicine in the school of medicine at Strasburg, where he remained till his death, which took place on the 27th of June, 1814.

He wrote several works on botany and medicine, but that which secured him the greatest reputation is his 'Natural History of the Plants of Dauphiné' (*Histoire Naturelle des Plantes du Dauphiné*). This work was published in 4 volumes, 4to., in 1786 and successive years. It contains 65 plates of the plants described. Each of the volumes contains a preface, in which an account is given of the various excursions which he had made. All the plants are arranged according to a classification of his own, in which he reduces the number of the Linnæan classes to twelve, by considering only the number of the stamens as a character of the classes. Under these classes he arranges 27 natural orders, named after the 'Fragments' of Linnæus. It also includes a dictionary of terms, and lists of plants found in particular districts. This work was submitted to the French Institute, and a critical report given of its merits by Jussieu, Geoffroy, and Tessier. Although in some respects unfavourable to the work, the author was modest enough to print each report of the members of the Institute at the commencement of the volumes as they appeared. In 1801 he published a catalogue of the plants growing in the botanic garden at Strasburg, in which he arranged the plants according to the system of Jussieu. He published several other books and memoirs on various departments of natural history and topography. His principal work on medicine was entitled 'Principes de Médicine et de Chirurgie,' and was published at Lyon in 1797. He also gave an account of an epidemic fever which prevailed in Dauphiné during the years 1779 and 1780. At his death he left behind him an extensive library and a large collection of plants. In a prospectus of his large work on plants, he named a species *Berardia*, after Berard, an apothecary, who lived at Strasburg, and was a contemporary of the Bauhins, and who left behind him a manuscript work on plants, still in the public library at Strasburg. A genus of plants has been named in honour of Villars, *Villarsia*.

(*Biog. Univ.*; Bischoff, *Lehrbuch der Botanik*; 'Prefaces' to volumes of the *Plants of Dauphiné*.)

VILLA'RSIA, a genus of plants belonging to the natural order of Gentianaceæ. This name was given in honour of Villars, a French botanist, who published a Flora of Dauphiné in 1786, and which, on account of its excellence, is used even at the present day. The species were formerly included under *Menyanthes*, and was formed by Robert Brown. It has a 5-parted calyx; a subrotate corolla with spreading limb, the segments with a flat disk; 2-lobed stigmas, the lobes toothed; 5 hypogynous glands; a 1-celled 2-valved or valveless capsule; seeds naked, or girded with a membranous margin. There are about sixteen species of this genus: they are either aquatic or marsh plants, with alternate entire leaves and yellow flowers. They are inhabitants of all parts of the world. One only is a native of Europe.

V. Nymphæoides, Nymphæa—like Villarsia, is a floating plant, with orbicular-cordate leaves; the peduncles single-flowered and aggregate; the segments of the corolla ciliate. It is a native of Denmark, Holland, Sweden, Germany, Piedmont, and of Siberia. It is found in ditches and slow-running streams. It is also a native of Great Britain, though comparatively a rare plant. It is found in the Thames, in the recesses of the shores near Walton Bridge, near Botley Bridge, Godstow Bridge, and Hinksey Ferry. It occurs also in the fens of Lincolnshire and in

Yorkshire. It is a beautiful plant, and may be easily cultivated. It has a large yellow flower, which is curiously plaited. It is a very abundant plant in Holland, frequently covering large tracts of the canals with its beautiful yellow flowers and dark green leaves.

V. ovata, Ovate-leaved Villarsia, is an erect plant, with ovate erect leaves, panicled racemose flowers, and the segment of the corolla ciliated. This plant grows in wet boggy places at the Cape of Good Hope. The flowers are of an orange-yellow colour, and its stem rises to a height of one or two feet. It requires a wet soil, but is not a floating plant.

V. parnassifolia, Parnassia-leaved Villarsia, has the radical leaves ovato-cordate; the stem elongated, nearly naked; the flowers panicled; the segments of the corolla with entire margins; valves of the capsule bifid; the seeds scabrous. This is a marsh plant, and, with two or three other species, is found on the south coast of New Holland and in Van Diemen's Land. It is the tallest species of the genus, and varies much in its unessential character.

V. indica and *cristata* are found in most parts of India floating in tanks and pools of fresh water, and are both noticed under the name of Cumada by Sir Wm. Jones. A variety of V. indica is also found in Nepal. V. nymphæoides, usually considered a native of Europe only, is also found floating on the lakes of Cashmere. This species was stated by Thunberg to be found floating on water in Japan; but his plant is now considered a distinct species, and is called V. peltata. V. indica is said to be accounted a sacred plant by the Chinese.

All the species of Villarsia are elegant plants when in blossom, and deserve a place in the garden and greenhouse. The hardy species may be grown in a pond, and they are easily increased by seeds or dividing their roots. The species requiring the greenhouse should be grown in cisterns. The bog or marsh species may be grown in pots, containing a mixture of peat and sand, and placed in deep pans of water.

VILLE. [Rhin Bas.]

VILLEFRANCHE. [Garonne, Haute; Pyrenees Orientales; Rhône, Department.]

VILLEFRANCHE, distinguished as VILLEFRANCHE-SUR-AVEYRON, a town in France, capital of an arrondissement in the department of Aveyron, 310 miles in a direct line south of Paris, or about 404 miles by the road through Orléans, Châteauroux, Limoges, Uzerche, and Cahors; in 44° 20′ N. lat. and 2° 1′ or 2° 2′ E. long. The town stands in a pleasant situation at the confluence of the Alzou, or Alsou, with the Aveyron, on the right bank of the latter. The population, in 1831, was 7360 for the town, or 9540 for the whole commune; in 1836 it was 8738 for the commune. There are a number of copper-works, and some hat-manufactories, tan-yards, and paper-mills; packing-cloth is also made, and trade is carried on in corn, hemp-seed, cattle, and wine. There are twelve yearly fairs. Villefranche was the native place of the Marshal de Belleisle.

The arrondissement of Villefranche comprehends 137 communes, and is divided into 7 cantons: the population, in 1831, was 77,990.

(Malte-Brun, *Géographie; Dictionnaire Géographique Universel*.)

VILLEIN, or VILLAIN, denotes a species of bondman subject to his feudal superior. In England, during the Anglo-Saxon period, the majority of the people appear to have been in a servile condition. The Saxon conquerors of England had brought with them from Germany the practice of slavery, and the continual wars of the Heptarchy and the Danish invasions deprived great numbers of their liberty; for prisoners taken in battle became slaves. There were then two classes of slaves: the one attached to the household of their lords and performing domestic services; the other, predial and engaged in the cultivation of the soil. The latter resembled the slaves of the Germans, of whom Tacitus observes, that they resided with their families on the estate of their lord, and formed no part of his menial establishment. The Germans had unlimited power over their slaves, and might kill them with impunity; and if they killed the slave of another, they only had to pay his price to the owner. The power of the master among the Anglo-Saxons, though very extensive, had some limits. If a master beat out the eye or the tooth of his slave, the slave was entitled to his freedom; if he killed him, he paid a fine to the king, unless the slave lived a day after the wound was inflicted, in which case the offence was unpunished. The Norman conquest did not materially alter the state of slavery in England. The lands were transferred to Norman masters, and the slaves passed as part of the property. Many freemen also were then reduced to servitude, having been taken prisoners while fighting against the invaders. After the Conquest there were four classes of slaves. 1, Villeins in gross, who were the personal property of their lords and performed the lowest household duties. They were very numerous, and not being particularly allotted to the soil, they were frequently sold and even exported to foreign countries. (Walsingham, *Hist. Ang.*, p. 258.) 2, Villeins regardant, or predial slaves, who were attached to the soil and specially engaged in agriculture. These were in a better condition than villeins in gross, were allowed many indulgences, and even, in some cases, a limited right of property; yet the law held that the person and property of the villein belonged entirely to his lord, the rule being the same as that in the Roman law, that whatever was acquired through the slave was acquired by the lord. They were frequently permitted to absent themselves from the lands of their masters and to employ themselves in trade upon paying to the lord a fine called *cheragium* or chevage (that is, literally, 'headage'), as an acknowledgment of their subjection and villenage. If they did not return regularly, or neglected to pay the fine, they might be pursued as runaways, for which purpose the aid of the king's officers might be had; but if no claim were made within a year, the villein became privileged, and was considered free. (Bracton, 5, 6.) 3, Another class, differing from the last more in name than in character and condition, is repeatedly mentioned in Domesday Book as Cottars or *Cottarii*. These had been instructed in some trade or handicraft, which they practised for their masters, as residing on the estate, and subject to the lord in the same manner as the predial slaves. 4, Another class often found in Domesday Book are the *Bordarii*. In what respect they differed from the other denominations of villeins is not apparent. Lord Coke calls them 'boors holding a little house with some land of husbandry, bigger than a cottage.' (1 *Inst.*, lib. i., sect. 1.) But they do not appear to have been all engaged in agriculture. In the town of Huntingdon there were returned 100, in Norwich 480, and 20 in Thetford. (*Domesday Book*, vol. i., pp. 173, 203; vol. ii., p. 116.) Bishop Kennett says, 'The Bordarii were distinct from the servi and villani, and seem to be those of a less servile condition, who had a bord or cottage with a small parcel of land allowed to them, on condition they should supply the lord with poultry and eggs, and other small provisions for his board and entertainment.' (*Parochial Antiquities*, 'Glossary.') Brady places them in a much lower condition. 'They were drudges, and performed vile services, which were reserved by the lord upon a poor little house, and a small parcel of land, and might perhaps be domestic works, such as grinding, thrashing, drawing water, cutting wood, &c.' ('Preface to *History of England*, p. 56.) [Bordarii.]

In addition to these special denominations, a class is distinguished from them in Domesday as *servi*; but whether these differed in their legal or social condition from other villeins is nowhere explained. Bishop Kennett conjectures that they were villeins in gross without any determined tenure of land, and whose services were undefined. It is very possible that the term may have been frequently applied to all the classes of villeins as a generic term, and sometimes to particular classes only, usually distinguished by other names. The names would vary in particular districts, and the enumerators would not all observe the same classification. The probability of this circumstance is confirmed by similar variations in Domesday, and by the experience of modern statistical inquiries.

The two classes first mentioned, viz. the villeins in gross and villeins regardant, were the most numerous, and may be said indeed to include the others, which, though differing sometimes in name only, and sometimes in minor particulars of service and condition, were but varieties of the servile class, partaking more or less either of the domestic or of the predial character. The relative numbers of the different classes as distinguished in Domesday may be fairly estimated from the county of Sussex, in which there were, about the year 1085, 5860 villani (in gross and regardant, but not separated), 2510 bordarii, 738 cottarii, and 415 servi.

The following are some of the legal conditions of the state of villenage:—

Persons were villeins either by prescription, their ancestors having been in that condition time out of mind, or by acknowledgment and confession in a court of record. The former were the original villeins regardant, who had always belonged to a manor. If they were transferred by deed from one to another, they became villeins in gross, as did all who confessed themselves villeins in a court of record.

If a villein married a free woman, the children were villeins; but if a female villein or niefe married a free man, the children were free. A bastard could only become a villein, by confession in a court of record, for having in law no father, or, as it was phrased, being *nullius filius:* he could not of course be claimed as a villein by descent.

If a villein purchased land, the lord might enter upon it; if he possessed goods, the lord might seize a part in the name of the whole, and immediately became the legal owner of them. A villein was able to sue any person except his lord, and even against him he might have an appeal of his ancestor's death. A niefe might also have an appeal of rape. Although the law did not allow a lord to maim his villein, the latter could not have an appeal of mayhem, because the lord could immediately retake the damages; but he might have had an indictment. (Littleton, 132-208.)

As society advanced, the state of slavery became less adapted to the interests of proprietors, and the villeins were becoming a more important class. Frequent manumissions were the consequence. These were generally performed by deed, but frequently by will, and there were also many acts of the lord which were considered as implied manumissions, and entitled his villeins to freedom. By these means the social condition of villenage became less and less general, and at length disappeared altogether. In England a few instances of predial servitude existed so late as the reign of Elizabeth and perhaps at a still later period. (Barrington, *On the Statutes*, 274; Hallam's *Middle Ages*, vol. i., p. 223.) In some parts of France it existed down to the time of the Revolution. In Russia predial servitude is still universal and unmodified: in Poland it was unmitigated until 1791, and though defined by law in 1807, still exists in an improved form. In Hungary it prevailed in a most offensive shape until 1836, when the nobles renounced some of their privileges and extended the civil rights of the peasantry. [Villenage.]

(Bracton; Littleton; Coke's *First Inst.;* Reeves, *Hist. of English Law;* Blackstone's *Commentaries*, &c.)

VILLENAGE was a base tenure of land, which, according to Sir William Blackstone, was 'neither strictly feudal, Norman, or Saxon; but mixed and compounded of them all; and which also, on account of the heriots that usually attend it, may seem to have somewhat Danish in its composition.' Originally this tenure was founded on the servile state of the occupiers of the soil [Villein], who were allowed to hold portions of land at the will of their lord, on condition of performing base and menial services. Where the service was base in its nature, and uncertain as to time and quantity, the tenure was called pure villenage; but where the service, though base, was certain and defined, it was termed privileged villenage, and sometimes villein-socage.

So long as the services were properly performed, the lord had no interest in disturbing the occupation of his villeins; and thus it frequently happened that lands held in villenage descended, in uninterrupted succession, from father to son; until, at length, the occupiers became entitled by prescription or custom to hold their lands against the lord so long as they performed the required services. And although the villeins themselves acquired freedom, or their lands came into the possession of freemen, the villein services were still the condition of the tenure, according to the custom of the manor. The customs of the several manors were either proved by the rolls of the Courts Baron or by constant immemorial usage; and as the tenants thus depended for their titles upon entries in those rolls or copies authenticated by the steward, they become gradually known as tenants by copy of court roll, and their tenure as a copyhold. While the tenure of the land had thus been growing more secure, the character of the services had become defined, and in the reign of Edward IV. a pure villenage was no longer known. The gradual improvements of the tenure, whether caused by encroachments of the tenants, by the liberality of the lords, or by bargains between them, did not alter the form of title. The copyhold lands were still supposed to be held at the will of the lord, and the tenant could not aliene them by deed, but was obliged to surrender them to the lord, in court, to the use of him who was to have the estate.

At the Conquest there were freemen holding their lands by free services, or by free customs, who were then ejected, but who were re-admitted on consenting to hold in villenage and to perform base services, but such as were certain and expressed by name. Such tenants hold by copy of court roll; but these admittances are not, as in ordinary copyholds, to hold at the will of the lord, but to hold according to the custom of the manor; from whence they have been called free copyholders or customary freeholders.

The act 12 Charles II., c. 24 (for taking away tenures in capite, and by knights' service), expressly provided (sec. 7) that it should 'not alter or change any tenure by copy of court roll, or any services incident thereto.' The tenure has therefore continued until the present day, subject to rents, fines, and heriots, payable to lords of manors, varying with the customs of each manor. The chief disadvantage of a copyhold tenure is the uncertainty of many of the fines and other demands upon the tenant, for the removal of which the act 4 & 5 Victoria, c. 35, was passed. By this act the Tithe Commissioners were empowered to commute all fines and other customary payments into rent-charges, assessed according to the price of corn, in the same manner as tithe rent-charges [Tithes], and into small fixed fines not exceeding 5*s.* upon death or alienation. Provision was also made for the complete enfranchisement of copyhold lands on paying the estimated value of the customary rents, fines, and heriots. As yet very little has been effected under the powers of the act.

(Bracton; Littleton; Coke, *First Inst.;* Wright's *Law of Tenures;* Gilbert's *Law of Tenures*, by Watkins; Reeves, *Hist. of English Law;* Blackstone's *Commentaries.*)

VILLENEUVE. From the birth of Romée de Villeneuve, grand-seneschal of Provence in 1170, to the death of Vice-Admiral Villeneuve in 1806, there has almost always been some one of this name to lend it distinction in France.

Romée de Villeneuve (born 1170, died soon after 1250) deserves to be remembered in the history of France as one of the earliest statesmen who appears to have comprehended the importance of uniting all the Gallic provinces into one nation. The history of his early life is obscure and distorted by fables. Created constable of Provence by Berenger before 1238, he besieged and took Nice, which had revolted against the count. Villeneuve frequently made that city his place of abode during his subsequent career, and conciliated its citizens by his wise and humane government. He fought bravely against the Pisans and Genoese, patronised the Troubadours in general, and punished some in particular who sinned against morality in their writings. On the 12th of July, 1238, Berenger nominated him in his will regent of Provence, and guardian of Beatrice, his fourth and unmarried daughter. On the death of Berenger, in 1245, Villeneuve assembled the nobility of Provence, and persuaded them to swear fealty to Beatrice. He next married his ward to Charles of Anjou, brother of St. Louis, who had, many years before in a great measure through the instrumentality of Villeneuve, been married to Marguerite, her elder sister. The regent procured the insertion of a clause in the marriage contract of Charles of Anjou, in virtue of which the territories of Provence, if Beatrice died without male issue, were to descend to the offspring of her sister Marguerite by St. Louis. The object of this arrangement was realised two centuries later by Palamède de Forbin. After this marriage Villeneuve appears to have withdrawn himself from public life. His name only appears again in the page of history in the mention of his will, by which he disposed of an enormous fortune for that age.

Elion, or Helion, De Villeneuve (born in 1270; died in 1346), of the same family as the preceding, entered in early life the order of St. John of Jerusalem, and, in 1319, on the abdication of Foulques de Villaret, grand-master of Rhodes, was elected his successor. Before

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repairing to his seat of government, the new grand-master visited several courts to collect contributions for his Order, which was at that time deeply involved in debt. The division of the order into langues has been attributed to him, and is said to have been proposed at a chapter which he held at Montpellier soon after his election. His visits to the courts above noticed, and a severe attack of illness, prevented his reaching Rhodes before 1336: the remaining ten years of his life were exclusively devoted to the discharge of his official duties. In 1344 he in person besieged and took Smyrna. It is of the period of his grand-mastership that the legend of the Dragon and the Knight of Rhodes is told.

Rosaline de Villeneuve (born 1263, died 1329), sister of the grand-master of Rhodes, was famous for her piety, her charity, and her ascetic exercises of devotion. In 1310 she was elected head of the order of Chartreux. She was canonized after her death; and some legendary writers have attributed in a great measure to her intercession the suppression of the heresy of the Albigeois.

Louis de Villeneuve, premier marquis de France, distinguished by the title 'Riche d'Honneur,' belonged to the same family. He was born about 1451, and died in 1516. Charles VIII., whose chamberlain he was, intrusted Villeneuve with the command of the army destined for the conquest of Naples. When Louis XII. mounted the throne, he sent Villeneuve as his ambassador to the papal court. At Rome the Provençal ambassador received extraordinary honours; the Romans were charmed with his manly and persuasive eloquence; and his popularity was the occasion of his being again employed on a mission to that court at the perilous crisis of 1500. Villeneuve was the intimate and esteemed friend of Bayard and Gaston de Foix. In 1505 Louis XII. erected the barony of Trans, hereditary in the family of Villeneuve, into a marquisate, the first instance of that title being conferred in France. The only son of Louis de Villeneuve fell at the king's side in the battle of Marignan, and the father, already enfeebled by wounds and years, died not long after of grief, in the month of July, 1516.

Christophe de Villeneuve (born 30th June, 1541; died 26th July, 1615) was also a member of this illustrious family. He was in his youth page to François de Lorraine, duc de Guise. He entered the service of Claude of Savoy, and earned a high reputation for bravery in that prince's campaigns against the Huguenots. On the death of the duke of Savoy, Villeneuve remained attached to the Comte de Carces, his lieutenant and successor in the government of Provence. DeCarces intrusted to Villeneuve the delicate mission of moving the king to countermand the orders for the massacre of St. Bartholomew. The envoy reached Paris on the same day that a messenger was dispatched from that city by the king, with fresh orders for the massacre. His representations were however successful in partially shaking the resolution of the king, who sent for him in the course of the night, and charged him with a message to De Carces, countermanding his previous orders in so far as Provence was concerned. Villeneuve started immediately, passed the messenger of death on his way, and reached Aix in time to save Provence from the massacre. The subsequent career of Villeneuve was as honourable as this its commencement. He served with distinction Henri III., Henri IV., and Louis XIII.

There have been several authors of the name of Villeneuve. **Huon de Villeneuve**, an antient French poet of some reputation, was a contemporary of Philippe Auguste. He was one of the earliest versifiers of the legends of the Twelve Peers. His principal work is 'Le Quatre Fils d'Aymon,' next to which perhaps ranks his 'Doolin de Mayence,' of which a prose translation into more modern French was published at Paris in 1501, with the title 'Fleur des Batailles.' **Guillaume de Villeneuve**, a good soldier, who served Charles VIII. in his Neapolitan campaigns, published in 1497 'Mémoires sur la Conquête de Naples.' It is the only narrative by an eye-witness of the adventures of the French army and partisans from the departure of Charles till their final expulsion. **Gabrielle Susanne Barrot**, dame de Villeneuve (born about 1695; died in 1755), was a friend of Crebillon, and published many tales and romances. Only one has retained hold of the popular mind, and that in the form of an abridgment: it is the famous 'Beauty and the Beast.'

The reputation of the name of Villeneuve was well sustained during the wars of the French revolution by **Pierre Charles Jean Baptiste Silvestre de Villeneuve**, vice-admiral. He was born at Valensoles in Provence, on the 31st of December, 1763. He entered the navy in his fifteenth year, and obtained the command of a vessel in 1793. In 1796 he was promoted to be commodore (capitaine de division), and a few months later to be rear-admiral (contre-amiral). He was appointed to command a division of the fleet destined for the invasion of Ireland; but contrary winds detained him in the Mediterranean, and rendered the expedition abortive. At Aboukir Villeneuve commanded the Guillaume Tell, and carried off his own vessel, with two other ships and two frigates, in safety after the defeat. In 1805 he was placed in command of a squadron, the main object of which was to withdraw the British fleet from the shores of Europe. With this view he sailed for the Antilles, where he did some mischief among the English traders, and attacked the Diamond. As soon as Villeneuve heard of the arrival of the English fleet at Barbadoes, his mission being accomplished, he reimbarked his troops, and set sail for Europe. On the 22nd of July, 1805, he encountered, off Cape Finisterre, the English fleet under Sir Robert Calder. An engagement took place, which continued till nightfall. Next morning neither the French nor the English admiral sought to renew the action, and for failing to do so both were reprimanded by their respective governments. This reprimand so chafed the spirit of Villeneuve, that, when he again put to sea, an instruction to his captains, issued on the 20th October, 1805, contained the remarkable expression—'Every captain who is not in action (dans le feu) is not at his post, and a signal of recall will be a brand of dishonour to him.' In the battle of Trafalgar, Villeneuve was taken prisoner after displaying throughout the fight the most perfect self-possession and high courage. He was carried to England, and detained there till the month of April, 1806. On his arrival at Rennes, he wrote to the minister of marine that he was in France, and waiting the orders of the emperor in that town. This was on the 17th of April. Four days elapsed, and he had received no answer. Mindful of the rebuke he had received on a former occasion, this delay appears to have unsettled the mind of Villeneuve. On the 22nd of April he was found dead in his apartment by wounds inflicted by his own hand.

(*Biographie Universelle.*)

VILLENEUVE D'AGEN. [Lot et Garonne.]

VILLENEUVE-LES-AVIGNON. [Gard.]

VILLENEUVE-SUR-YONNE. [Yonne.]

VILLERS, G. [Buckingham, Dukes of.]

VILLERS, CHARLES FRANÇOIS DOMINIQUE DE, had, next to Madame de Staël-Holstein, the chief share in making German literature known to the French at a period when the French, clinging to old prejudices and intoxicated by recent victories, treated Germany with neglect and contempt. He was born on the 4th of November, either of 1764 or 1767, at Belchen, a small town in the part of Lorraine which is inhabited by Germans. His father was chief receiver of the taxes, and a royal counsellor; by his mother's side, a baroness de Launage, he is said to have been allied to the family Du Lys, which is descended from the brothers of Jeanne d'Arc, the maid of Orleans. He received a military education at Metz, and as early as 1782 was appointed lieutenant in the artillery. His first literary essay was on magnetism, which was then the favourite science of the day. He lived alternately at Strasburg and Metz, and he filled up his leisure hours with studying history, antient and modern literature, as well as Greek and Hebrew, which he had hitherto neglected. Excited, though not misled, by the Revolution, he wrote a witty political satire in verse, entitled 'Le Députés aux Etats Généraux;' and in 1791 he published his celebrated work 'De la Liberté.' In this work, which went through three editions in the course of one year, he laid down political principles which were very dangerous not only for those who published them, but even for those who received them. At a period when the bloody tyranny of the people began to be established in France, he had the courage to place on the title of a work on liberty the motto, 'Aliud est, aliud dicitur;' and in the face of the most fanatical democrats he said 'that it was dangerous to preach liberty to the people, because they always confounded liberty with the desire of indulging their will in everything;' and 'that the people in insurrection were the worst tyrants of all.' No sooner had the Jacobins established their power, than they pursued Villers, who, after many perilous adventures, escaped to Germany, and settled at Holzminden on the Weser. Though acquainted with the German language, he had the most unfavourable opinion of German literature, because he had never read any good book in the language, and he had all the prejudices against the Germans which were then prevalent in France. At Holzminden however he made the acquaintance of Dr. Brandis, known by his excellent works on medicine and philosophy, who became afterwards first physician to the king of Denmark. His intercourse with this learned medical man, and his friendship with Kästner, Spittler, Heeren, and Schlözer at Göttingen, where he stayed from 1794 to 1796, led Villers not only to abandon his prejudices against the Germans, but to become the most active and generous defender of this nation against his own countrymen, the French. His friendship with the learned daughter of Schlözer, Mrs. Dorothea von Rodde, upon whom the University of Göttingen had conferred the title of Doctor in Philosophy, exercised still greater influence over him. In 797 he followed Mrs. Dr. von Rodde and her husband, to Lübeck. From this time he lived alternately at Lübeck and Eutin, then the residence of Voss, Count Stollberg, Jacobi, nd other distinguished scholars, poets, and philosophers. His chief object was to mediate between the French and Germans, by eradicating their national prejudices, and by ranslating several of the best German works into French, mong which was Heeren's 'Essay on the Influence of the rusades.' Reimarus persuaded him to write for the 'Spectateur du Nord,' one of the best newspapers of the time, which was published at Hamburg, and which in the course f one year received sixty leading articles from Villers. Hanover having been occupied by the French in 1803, he ddressed a letter to the French officers, urging them to pare and to respect the people. In 1804 he published his Essai sur l'Esprit et l'Influence de la Réformation de Luther,' a masterpiece, which was crowned by the Institut e France, and which was translated into English (by B. Lambert, London, 1805*), German (thrice), Dutch, and wedish. In 1806 Lübeck was taken by storm by the rench, who would have destroyed the whole town and massacred its inhabitants, but for the courage and activity f Villers, who exposed the revolting brutality and immorality of the French troops in his 'Lettre à M^me. la Comsse Fanny de Beauharnois sur Lübeck.' This pamphlet aused him much persecution, especially from Davoust, in 811. Although he attacked the policy of Napoleon on everal occasions, and especially by his articles against the ontinental System, Jérome Bonaparte, king of Westhalia, appointed him, in 1811, professor of philosophy or the branches of literature and history) in the University of Göttingen. Jérome having ordered the abolition of is university, Villers, at the request of Heyne, Heeren, d John von Müller, represented to the king the consequences of this measure, and the king countermanded his der. Villers was esteemed and cherished both by Frenchen and Germans, and the Germans looked on him as their usty friend and protector. He had nevertheless many emies, especially among those who could or would not y aside their prejudices; and the frequent attacks which ere made upon his character gradually ruined his health. fter the House of Brunswick had been restored to the ssession of Hanover in 1813, Villers was dismissed from s post: he received a pension of 3000 francs, but he was dered to return to France. As he had committed no ime, he protested against this order, and it was discored that he had been calumniated to the Prince Regent, terwards George IV., who, at the request of Count Müner, augmented the pension of Villers to 4000 francs, and lowed him to live in Hanover; but he was not permitted continue his lectures. He had just been invited to the niversity of Heidelberg, when he died of consumption, the 26th of February, 1815, with the reputation of havg been one of the most enlightened and best men of his ne, who had sacrificed himself for the good of others. llers also wrote—'Philosophie de Kant, ou Principes ndamentaux de la Philosophie Transcendentale;' 'Lettre George Cuvier sur une Nouvelle Théorie du Cerveau r Gall;' 'Rapport sur l'Etat de la Littérature Ancienne de l'Histoire en Allemagne;' 'Précis Historique de la Vie de Martin Luther, traduit du Latin de Melanchthon, avec des Notes,' &c. He had begun the Life of Luther, but death prevented him from finishing it. The authorities cited below contain a list of his works.

(*Biographie Universelle; Zeitgenossen*, vol. ii. (1818), pp. 55-78.)

VILLOISON, JEAN BAPTISTE GASPARD D'ANSSE DE, one of the most eminent Greek scholars of modern times, was born at Corbeil-sur-Seine on the 5th of March, 1750. Among the scholars to whose instruction he was principally indebted we may mention Le Beau and Capperonnier, but Villoison soon surpassed all his fellow-students, and his teachers also, and pursued his studies of the authors of antient Greece with such perseverance, that at the age of fifteen he had read nearly all the Greek authors. He soon also gave evidence that his extensive reading was not superficial, for he was scarcely twenty-two years old when he published from a MS. at St. Germain the first edition of Apollonius's Lexicon on the 'Iliad' and 'Odyssey,' together with the fragments of Philemon (Paris, 1773, 2 vols. fol., reprinted at Leipzig in the same year in 2 vols. 4to.), with very valuable and learned Prolegomena and notes. Before the edition was printed, he submitted it to the Academy of Inscriptions, which elected him a member, although he had not yet attained the age at which this honour could be conferred upon him according to their rules. He was now looked upon not only in France, but in Europe also, as a prodigy of learning, and he formed extensive literary connections with scholars of various parts of Europe. But he did not allow himself to be dazzled by the fame thus early acquired, nor to sink into inactivity; he pursued his studies with the same ardour as before; and in 1778 he published a new edition of the pastoral poem of Longus with a very learned commentary. His ambition however was rather to publish such antient works as had not yet appeared, than to prepare editions of those authors which were already in print. The government being informed of this desire of Villoison, he was sent in 1778, at the expense of the state, to Venice, to search the library of St. Mark. Here he formed an intimate friendship with the Abbé Morelli, with whose assistance he discovered numerous rhetorical and grammatical works and fragments of works of that kind which had not yet been printed. These, together with some other similar works which he had before discovered at Paris, were published under the title 'Anecdota Graeca e Regia Parisiensi et e Veneta S. Marci Bibliotheca deprompta,' Venice, 1781, 2 vols. 4to. Valuable as these anecdota are, their publication was too hurried, and it was afterwards discovered that Villoison had published some things as new, which had appeared in print long before his time. Another more important discovery which he made in the library of St. Mark, was a MS. of Homer's Iliad, which probably belonged to the tenth century, and contained very antient scholia (now known under the name of the Scholia Veneta), and marginal notes which pointed out such verses as were supposititious, corrupt, or transposed. This valuable treasure, together with very learned prolegomena by Villoison, appeared at Venice, 1788, fol. It was perhaps appreciated by no one so well as by F. A. Wolf, whose theory of the Homeric poems is based in a great measure upon the information derived from this discovery. Several years before the printing of this work was completed he was invited by Amalie, Duchess of Saxe-Weimar, and her son Carl August, to pay them a visit in Germany. Villoison accordingly left Venice and went to Weimar, where he spent about a year in searching the library of that capital. The results of his learned inquiries were published in his 'Epistolæ Vimarienses, in quibus multa Graecorum Scriptorum loca emendantur ope librorum Ducalis Bibliothecae,' Zürich, 1783, 4to. The year after he edited at Strasburg a Greek translation of the Old Testament, which he had discovered at Venice, and had been made by a Jew in the ninth century of our æra. In 1785 he accompanied the French ambassador at the court of Constantinople, Count Choiseul Gouffier, to Constantinople, and travelled about for three years in the islands of the Archipelago and the continent of Greece. His hopes of finding MSS. of antient authors not yet published were disappointed, but he made himself perfect master of the modern Greek language, and collected a vast quantity of materials partly with a view to make a new and improved edition of Tournefort's travels, and partly to write a complete description of antient and modern Greece. But the unhappy condition in which he found his country on his return prevented the realization of these plans. Villoison withdrew to Orleans, and began to read through all the antient authors in order to collect materials for his great work on Greece. After the storms of the Revolution had passed away, he returned with his literary treasures to Paris, and having lost the greater part of his property, he began a course of lectures on the Greek language, in which however he did not meet with much success. He was made a member of the National Institute of France, and Napoleon afterwards appointed him professor of antient and modern Greek in the Collége de France, but he had scarcely entered upon this office when he was seized by an illness which terminated in his death on the 26th of April, 1805. The 'Memoirs' of the Academy of Inscriptions contain several valuable papers by Villoison. The materials for his great work on Greece, in fifteen large quarto volumes, as well as his remarks on Tournefort and on Montfaucon's 'Palaeographia Graeca,' of which he likewise intended to publish a new edition, are in MS. in the royal library of Paris.

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* Another English translation, with a preface and notes by James Mill, i exceedingly scarce.

Villoison was a man of prodigious learning: he possessed an extraordinary memory, and a quick and penetrating mind; but his thirst for knowledge was so great, that he scarcely allowed himself time to digest that which he had acquired, and all the defects of his works arise more or less from this haste and want of reflection.

(Dacier, in the *Memoirs of the National Institute of France; Biographie Universelle.*)

VILNA. [WILNA.]

VIMOUTIERS. [ORNE.]

VINA'GO. [COLUMBIDÆ, vol. vii., p. 367.]

VINCA (from *vinco*, to bind), a genus of plants belonging to the natural order Apocynaceæ. It has a 5-cleft calyx, with linear or subulate acute segments; a salver-shaped corolla, with the tube longer than the calyx, and the throat bearded, the segments of the limb flat, oblique, truncate at the apex; 5 stamens inserted in the throat enclosed with short filaments, each of the anthers ending in a hairy membrane at the apex, which connives over the stigma; the stigma is bearded, seated on a flat orbicular disk, which is grooved round the circumference; 2 glands alternating with the ovaries; 2 follicles, few-seeded, dehiscing lengthwise; the seeds cylindrical, naked, with fleshy albumen. Five or six species of this genus have been described: they are creeping, suffruticose, or herbaceous plants, with smooth, shining, opposite leaves, with blue, purple, or white flowers, seated on solitary, axillary, alternate peduncles. They are all natives of Europe, in shady places.

V. major, the Greater Periwinkle, has stems rather erect, ovato-acute, ciliated leaves; teeth of the calyx linear, subulate, ciliated, and usually with a smaller tooth on each side at the base; the segments of the corolla are broad and ovate. It is a native of the middle and southern parts of Europe, and is apparently wild in many parts of Great Britain, but it may be doubted whether it is an original native of this island. Its flowers are of a fine purple-blue colour, and are larger than those of any other species. The English name periwinkle seems to be derived from the French *pervenche*. In Chaucer's time it was called 'perwinke:'—

> 'There sprange the violet al newe
> And fresh pewinkè rich of hewe.'

The flowers appear early in spring, and continue open all the summer. It is well adapted for growing on the ground of shrubberies, as well as on the banks of hedgerows, or in any shady place. In olden times great virtues were attributed to the periwinkle, amongst other things Culpepper says 'the leaves of the periwinkle eaten by man and wife together do cause love between them.' In Italy this plant is called *fiore di morte*, from the practice of making garlands of it in which to bury dead children. It was at one time much used in sorceries and incantations, hence the French still call it *violette des sorciers*. In France too this plant has been lately much grown as a memorial of friendship. This has arisen out of a circumstance in the life of Jean Jacques Rousseau, in which, after thirty years, he was suddenly reminded of his early attachment to Madame de Warens by the sight of a periwinkle in flower. Hence the plant is consecrated *aux doux souvenirs*.

V. minor, the Lesser Periwinkle, has procumbent stems, elliptico-lanceolate glabrous leaves; the segments of the calyx linear-lanceolate and bluntish; the segments of the corolla broadish at top; the flowering stems usually erect. This is also a native of Europe, in the same situations as the last, and is often found in Great Britain. It varies much in the colour of its flowers, which are sometimes double. The leaves also often become variegated. It is not so large a plant as the last, and may be grown in the same situations.

V. herbacea, Herbaceous Periwinkle, has herbaceous prostrate stems, with oblong-lanceolate smooth leaves, stalked flowers, and a ciliated calyx. The flowers are of a pale blue colour. It is an elegant plant, and is a native of Hungary. *V. rosea* is an East Indian periwinkle; it has an erect stem with twin sessile flowers. Like all the species, it may be easily propagated by cuttings or dividing the roots. It is continually in flower. It has pale flowers, and two or three varieties are known in gardens.

All the species are easily cultivated, and are very desirable plants for gardens, as they retain their leaves all the year round.

VINCE, SAMUEL, a distinguished mathematician, and Plumian Professor of Astronomy and Experimental Philosophy in the University of Cambridge. He took orders, and he was promoted to the archdeaconry of Bedford. He died in December, 1821.

Professor Vince was elected a Fellow of the Royal Society in 1786, having previously written a paper on friction, which was published in the 'Philosophical Transactions' for 1785. This paper, which possesses considerable merit, contains a description of many experiments made on that subject, from which it is concluded that friction is a uniformly retarding force, and that it increases with the surfaces in contact, but in a less ratio than the weight or pressure of the moving bodies against each other: it is also shown that, when one body remains long at rest upon another, a certain degree of cohesion takes place, which increases the friction. It is right to observe that the second of these laws has not been confirmed by the experiments of M. Coulomb, this philosopher having found that the friction varies with the pressure of the bodies.

In the 'Philosophical Transactions' for 1795 there is a paper by Vince, entitled 'Observations on the Theory of the Motion and Resistance of Fluids,' in which are described several experiments relating to the discharges of water through pipes inserted, in vertical positions, in the bottoms of vessels. From these it is shown that, when the pipes are less than one inch in length, the ratio between the quantities discharged from a simple orifice and from a pipe are not exactly to one another in the subduplicate ratio of the depths, that is, of the distances from the upper surface of the water in the vessel to the orifice and to the lower extremity of the pipe; the results of the experiments are however found to agree better with the theory in proportion as the pipes are longer. Another paper by Vince, which is entitled 'Experiments on the Resistance of Bodies moving in Fluids,' was published in the volume of the 'Transactions' for 1798. These experiments were made with bodies at considerable distances below the surface; and it was found that when the body is a plane surface, and also when it is a hemisphere moving with the flat side foremost, the experimented resistances differed from the results of the general theory in the ratio of 3 to 2 nearly. The ratio between the resistance experienced by a plane surface at rest, when struck by a fluid in motion, and that which took place when the same plane was made to move in the fluid, the latter being at rest, was found to be nearly as 6 to 5; and this result agrees with that which was obtained by Du Buat.

In conjunction with the Rev. James Wood, Professor Vince published at Cambridge a 'Course of Mathematics and Natural Philosophy, for the Use of Students in the University;' and of this valuable work there have since been several editions with considerable improvements: the parts written by Vince are entitled 'Elements of Conic Sections, intended as Preparations for the reading of Newton's Principia;' 'Principles of Fluxions;' 'Principles of Hydrostatics;' and 'Elements of Astronomy.' In 1790 came out his 'Treatise of Practical Astronomy,' in quarto, containing descriptions of the constructions and the uses of astronomical instruments; but his principal work is a 'Complete System of Astronomy,' which was published at Cambridge in 3 vols. 4to. (1797 to 1808). The first volume contains accounts of the phenomena and motions of the moon and planets, deduced from observations; part of the second is occupied with the subject of physical astronomy, or investigations from the theory of general attraction, concerning the precession of the equinoxes, the movements of the moon and planets, of the apsides and nodes of the orbits, and the variations to which the inclinations of the orbits are subject: the remainder consists of several tables, of great utility in the solution of problems relating to practical astronomy. The third volume contains a complete series of astronomical tables with precepts for their use; they consist of Delambre's tables of the sun, moon, and planets, and of the satellites of Jupiter, and Burg's tables of the moon; the epochs being changed to the first day of January at Greenwich mean noon.

Professor Vince published a pamphlet entitled 'The Credibility of Christianity Vindicated,' in answer to Hume's objections in his 'Essay on Miracles;' and, in 1806, one entitled 'Observations on the Hypotheses which have been assumed to account for the Cause of Gravitation on Mechanical Principles.' The latter was read before the Royal Society, and was intended to be the Bakerian Lecture; but, for some reason, it was not published in the 'Transactions.' The writer endeavours to disprove Newton's supposition that gravity may be accounted for by means of an elastic fluid, and he concludes that the formation and preservation of the universe must be ascribed to the immediate agency of the Deity. He also published four Sermons, which he had preached before the University. The subject of these discourses is a confutation of atheism, from the laws and constitution of the heavenly bodies; the various adaptations of the parts of the solar system to one another are exhibited, and offered as proofs of design in its formation; and the correspondence of certain phenomena in that system to those which have been observed in the stars called fixed is stated as an evidence that the universe is under the superintendence of one Being.

VINCENNES. [SEINE, Department.]

VINCENT, ST., one of the islands of the Columbian Archipelago, situated between 13° 10′ and 13° 25′ N. lat. and 61° 10′ and 61° 20′ W. long., having Barbadoes on the east, Grenada on the south, and St. Lucia on the north. The area of St. Vincent is less than that of the county of Rutland, being 131 square miles, or rather more than 84,000 acres. It is one of the most beautiful islands of the Caribbee group, of an oval form, 18 miles long by 11 broad; and though the surface is irregular, the valleys, some of which are very beautiful, possess a fertile soil and are well watered. The coast is bold and rocky, and a range of high mountains crosses the island from north to south. The Grenadines consist of several small islets off the southern extremity of the coast. Bequia, the largest, has an area of 3700 acres, and there are seven others, some of which are partially cultivated. Bequia possesses a fine harbour, called Admiralty Bay. The most remarkable physical feature of St. Vincent is the Souffrière, a volcanic mountain 3000 feet high, with a crater half a mile in diameter, from the centre of which rises a conical hill 300 feet high, and 200 feet in diameter at the base. After a repose of nearly a century an eruption of the mountain took place in 1812. St. Vincent has several times suffered severely from hurricanes, but it is one of the healthiest islands of the archipelago.

St. Vincent was discovered by Columbus in 1498, at which time the natives were numerous, and continued to be so for a long period afterwards. The existence of two distinct races in the island, before its settlement by Europeans, one exhibiting the features of the African negro, is accounted for by a slave-ship from Guinea having, it is said, been wrecked on the coast about 1675. Early in the 18th century the negro Caribs, as they were called, had become very numerous, partly by the accession of runaway slaves from Barbadoes, and partly by the children they had by the Indian women, and they drove the aboriginal population into the north-west part of the island. In 1672 Charles II. included St. Vincent with Barbadoes and several other islands under one government, but this assumption of authority was merely nominal so far as relates to St. Vincent, which was seldom visited. In 1714 the French began to form a settlement with the permission of the natives; and in 1722 or 1723, George I. having granted the island to the duke of Marlborough, an expedition was undertaken to obtain possession of it, which failed. For many years afterwards it was a bone of contention between the French and the English, and the island was declared neutral by the treaty of Aix-la-Chapelle in 1748. When the English took possession of it in 1762, the settlers were chiefly French, but by the treaty of Paris in 1763 it was ceded to Great Britain. Ten years afterwards the Caribs were in open hostilities with the British, which continued two years, until they were pacified by a treaty concluded with them in 1773, under which a certain part of the island was assigned to them. The French took possession of St. Vincent during the American war, in 1779, but it was restored to the British crown at the peace in 1783. In the subsequent war with France, the Caribs, stimulated by French emissaries, revolted, and the result was the removal of the native population, about 5000 in number, to the island of Roatan, in the bay of Honduras. St. Vincent is a dependency of the government of Barbadoes, under a lieutenant-governor, who is assisted by a council of twelve members, who are usually official persons or dependent upon the governing power. The House of Assembly consists of nineteen members, returned from different districts of the island by freeholders and householders who hold the requisite property qualifications. It is urged that, instead of being subject to Barbadoes, the local government ought now to enjoy the advantage of direct correspondence with the Colonial office; and the rapidity and certainty of communication occasioned by the establishment of a line of steam-boats between England and the West India colonies renders this change not altogether unreasonable. St. Vincent is in the diocese of Barbadoes. The island was divided into five parishes in 1797.

In 1783 there were 61 sugar-estates in St. Vincent; 500 acres were planted with coffee; 200 with cacao; 400 were in cotton; 50 in indigo; and 500 in tobacco. The produce of the island in 1836, 1837, and 1838, was as follows:—

		1836.	1837.	1838.
Sugar .	. lbs.	51,591,196	22,987,009	21,867,080
Rum .	.gals.	363,522	408,945	329,742
Molasses.	.gals.	493,052	457,323	575,275
Arrow-root	. lbs.	49,369	44,461	27,374
Coffee .	. lbs.	535	642	282
Cocoa .	. lbs.	7,721	1,431	6,588
Cotton .	. lbs.	59,411	44,706	15,056

The following are the quantities of the chief articles of produce imported into Great Britain from St. Vincent, from 1831 to 1841 inclusive:—

	Sugar. cwt.	Molasses. cwt.	Rum. gals.	Coffee. lbs.	Cocoa. lbs.
1831	221,662	23,801	160,211	44	6,043
1832	186,812	28,228	29,732	..	242
1833	194,889	48,650	89,206	132	2,713
1834	213,017	33,094	93,397	197	4,279
1835	195,017	26,455	189,154	118	272
1836	186,482	37,967	12,183	..	1,350
1837	201,191	34,564	200,025	5,335	2,525
1838	194,182	45,669	181,562	99	3,191
1839	151,899	34,051	189,697	35	760
1840	101,020	16,529	145,909	699	6,442
1841	110,205	31,587	88,999	..	1,758

In 1837 the value of British produce and manufactures imported into St. Vincent was 178,415*l*., and the exports to the mother-country were valued at 379,686*l*. In 1838 the commerce of the island employed about 26,000 tons of shipping outwards; 43 ships sailed for the ports of the United Kingdom: 213 for British colonial ports; and 79 for foreign ports.

The population of St. Vincent in 1787 consisted of 1450 whites, 300 free coloured-persons, and 11,853 slaves. In 1834 the white population was 1301; free coloured-persons 2824; and the 'apprenticed labourers' (late slaves) were 22,997. The slave-owners received compensation out of the parliamentary grant to the amount of 590,779*l*. Kingstown, the capital of the island, contains about 2000 inhabitants. It has a few public buildings, and a church capable of holding 2000 persons. There is a botanic garden of thirty acres, which was formed more than half a century ago.

(Edwards's *West Indies*, vol. i., p. 407: *Parliamentary Returns*; Mr. Porter's *Tables*.)

VINCENT, EARL ST. [JERVIS, JOHN.]

VINCENT, WILLIAM, D.D., was born 2nd November, 1739, in the city of London, where his father carried on business, first as a packer, afterwards as a Portugal merchant, till he lost all he had through the failures that followed the Lisbon earthquake of 1755, in which also his second son perished. William, who was his third, was admitted a king's scholar of Westminster school in 1753, was thence elected a scholar of Trinity College, Cambridge, in 1757, and in 1761 took his degree of B.A., and was chosen a Fellow of his college. The next year he was appointed one of the ushers of Westminster school; in 1764 he took his degree of M.A.; and in 1771, having passed through the previous gradations, he rose to be second master of the school on the resignation of Dr. Lloyd. The same year he was also nominated one of the chaplains in ordinary to his majesty. Soon after this he married Miss Hannah Wyatt. In 1776 he took his degree of D.D. In 1778 he was presented by the Dean and Chapter of Westminster to the vicarage of Longdon in Worcestershire; but this living he resigned, after having held it about half a year, on being collated by the archbishop of Canterbury to the united rectories of Allhallows the Great and Less, in Thames Street, London. At length, in 1788, on the death of Dr. Smith, Dr. Vincent succeeded him as head-master of Westminster School. This situation he continued to hold, discharging its duties with distinguished ability, till, on the translation of Bishop Horsley from the see of Rochester to that of St. Asaph in 1802, he was nominated by the crown the bishop's successor in the deanery of Westminster, having already been presented to a prebend in that church the year before. In 1803 the rectory of St. John's, Westminster, which is in the gift of the dean and chapter, having become vacant, and the nomination falling to his turn, he took that living for himself and resigned Allhallows, which however he obtained for his eldest son. Finally, in 1805, he exchanged St. John's for the rectory of Islip in Oxfordshire, the patronage of which also belongs to the church of Westminster. He died at his residence in Westminster, on the 21st of December, 1815.

Dr. Vincent's first publication was an anonymous 'Letter to Dr. Richard Watson, Regius Professor of Divinity at Cambridge (afterwards bishop of Llandaff), occasioned by his Sermon preached before the University,' 8vo., Lond., 1780. It was an attack upon certain political principles announced in Watson's printed sermon. This was followed by 'A Sermon preached at the Yearly Meeting of the Charity Children at St. Paul's,' 4to., 1784; 'Considerations on Parochial Music,' 8vo., 1717; 'A Sermon preached at the Anniversary Meeting of the Sons of the Clergy,' 4to., 1789; and 'A Sermon preached at St. Margaret's, Westminster, for the Grey-coat School of the Parish,' 8vo., 1792. This last discourse, which was another proclamation and defence of its author's strong conservative politics, was printed at the request of the Association against Republicans and Levellers, by whom, it is said, above twenty thousand copies of it were distributed. In 1793 Dr. Vincent published a short Latin tract entitled 'De Legione Manliana, Quaestio ex Livio desumpta,' &c., 4to. It is an explanation of what had appeared to be an irreconcileable difference between the account of the Roman legion given by Polybius (book vi., c. 1) and what is said by Livy (book viii., c. 8) about a manœuvre of the consul T. Manlius in his battle with the Latins at the foot of Mount Vesuvius, A.U. 413. His next publication, which appeared in 1794, was a tract in 8vo., entitled 'The Origination of the Greek Verb, an Hypothesis.' Singularly enough, in the same week in which this performance issued from the press in London, there appeared at Edinburgh a volume of a new edition of the 'Encyclopædia Britannica,' in which, in an article on Philology, was given a view of the origination of the inflections of the Greek verb almost identical with that proposed by Dr. Vincent. The author of the Edinburgh article was the late David Doig, LL.D., a very remarkable man, then master of the grammar-school of Stirling, where he died at the age of eighty-one, in 1800. Vincent immediately sought out Doig, and although, we believe, they never met, they became friends through the medium of an epistolary correspondence. Vincent's speculation extended and put into a new shape, was reproduced the following year, 1795, under the title of 'The Greek Verb analyzed, an Hypothesis.'

In 1797 appeared, in a quarto volume, the first of the works which have principally established Dr. Vincent's reputation, 'The Voyage of Nearchus to the Euphrates, collected from the original journal preserved by Arrian.' [NEARCHUS.] This was followed in 1800 by 'The Periplus of the Erythraean Sea, part first, containing an Account of the Navigation of the Antients from the Sea of Suez to the Coast of Zanguebar, with Dissertations.' The Second Part, containing the navigation from the Gulf of Ælana to the island of Ceylon, appeared in 1805; and both the Nearchus and Periplus were republished together, in two volumes quarto, in 1807, under the title of 'The History of the Commerce and Navigation of the Antients in the Indian Ocean.' A Supplemental volume, containing the Greek text of the two voyages, was afterwards added, with an English translation and also part of Arrian's Indian History. This work forms one of the most important contributions to antient geography that modern scholarship has produced.

Dr. Vincent contributed several valuable articles to the 'Classical Journal,' and he was also a frequent writer in the 'British Critic' till near the close of his life. He printed, but did not publish, a letter in French, addressed to M. Barbié du Bocage, who had attacked his 'Nearchus.' His only other separate publications were, 'A Defence of Public Education, in a Letter to the Lord Bishop of Meath,' 8vo., 1802; and 'A Sermon preached before the House of Commons on the Day of General Thanksgiving for Peace,' 4to., the same year. The 'Defence of Public Education,' which he wrote and published immediately before terminating his connection with Westminster School, was an answer to certain attacks recently made on the system of our public schools, which was charged with a neglect of religious instruction. One of the principal authors of the attacks was Dr. O'Beirne, the prelate to whom Vincent addressed his 'Defence,' which passed rapidly through three editions. It is said to have been the only one of his publications from which he ever derived any pecuniary profit; he presented what he got from it to his wife as the first-fruits of his authorship. It was to this publication also that he was indebted for the deanery of Westminster, which was given him by Mr. Addington, then first lord of the treasury, avowedly as an expression of his admiration of the Defence of Public Schools. When Vincent republished his Nearchus and the Periplus in 1809, he dedicated the work to his patron, then become Lord Sidmouth.

By his wife, who died in 1807, Dr. Vincent had two sons, the Rev. W. St. Andrew Vincent and George Giles Vincent, Esq. The history of his life has been given at ample length by his friend Archdeacon Nares, in a communication printed in the 26th and 27th Nos. of the 'Classical Journal.'

VI'NCI, LIONA'RDO DA, one of the most accomplished men of an accomplished age, and for the extent of his knowledge in the arts and sciences yet unrivalled, was born at Vinci in the Val d'Arno below Florence, in 1452. His father Pietro da Vinci, of whom he was a natural son, was a notary, and in the year 1484 notary to the signory of Florence. He had three wives, but his son Lionardo was born before his first marriage, in his twenty-third year: the mother of Lionardo is not known. Lionardo evinced as a boy remarkably quick abilities for everything that he turned his attention to, but more particularly for arithmetic, music, and drawing: his drawings appeared to be something wonderful to his father, who showed them to Andrea Verrocchio. This celebrated artist was likewise surprised to see such productions from an uninstructed hand, and willingly took Lionardo as a pupil: but he was soon much more astonished when he perceived the rapid progress his pupil made; he felt his own inferiority, and when Lionardo painted an angel in a picture of the Baptism of Christ, so superior to the other figures, that it made the inferiority of Verrocchio apparent to all, he gave up painting from that time for ever. This picture is now in the academy of Florence. The first original picture of Lionardo's, mentioned by Vasari, was the so-called Rotella del Fico, a round board of fig-tree, upon which his father requested him to paint something for one of his tenants. Lionardo, wishing to astonish his father, determined to execute something extraordinary that should produce the effect of the head of Medusa: and having prepared the rotella and covered it with plaster, he collected almost every kind of reptile and composed from them a monster of most horrible appearance; it seemed alive, its eyes flashed fire, and it appeared to breathe destruction from its open mouth. It had the desired effect upon his father, who thought it so wonderful that he carried it immediately to a picture-dealer of Florence, sold it for a hundred ducats, and purchased for a trifle an ordinary piece, which he sent to his tenant. This curious production was afterwards sold to the duke of Milan for three hundred ducats.

Although Lionardo devoted himself enthusiastically to painting, he appears to have found time also to study many other arts and sciences—sculpture, architecture, engineering, and mechanics generally, botany, anatomy, mathematics, and astronomy; he was also a poet and an excellent extempore performer on the lyre. He was not only a student in these branches of knowledge, but a master. His acquirements cannot be better told than in his own words, in a letter to Ludovico il Moro, duke of Milan, when he offered him his services:—'Most Illustrious Signor—Having seen and sufficiently considered the specimens of all those who repute themselves inventors and makers of instruments of war, and found them nothing out of the common way: I am willing, without derogating from the merit of another, to explain to your excellency the secrets which I possess; and I hope at fit opportunities to be enabled to give proofs of my efficiency in all the following matters, which I will now only briefly mention.

'1. I have means of making bridges extremely light and portable, both for the pursuit of or the retreat from an enemy; and others that shall be very strong and fireproof, and easy to fix and take up again. And I have means to burn and destroy those of the enemy.

'2. In case of a siege, I can remove the water from the ditches; make scaling-ladders and all other necessary instruments for such an expedition.

'3. If, through the height of the fortifications or the strength of the position of any place, it cannot be effectually bombarded, I have means of destroying any such fortress, provided it be not built upon stone.

'4. I can also make bombs most convenient and portable, which shall cause great confusion and loss to the enemy.

'5. I can arrive at any (place ?) by means of excavations and crooked and narrow ways made without any noise, even where it is required to pass under ditches or a river.

'6. I can also construct covered waggons which shall be proof against any force, and entering into the midst of the enemy will break any number of men, and make way for the infantry to follow without hurt or impediment.

'7. I can also, if necessary, make bombs, mortars, or field-pieces of beautiful and useful shapes quite out of the common method.

'8. If bombs cannot be brought to bear, I can make crossbows, ballistae, and other most efficient instruments; indeed I can construct fit machines of offence for any emergency whatever.

'9. For naval operations also I can construct many instruments both of offence and defence: I can make vessels that shall be bomb-proof.

'10. In times of peace I think I can as well as any other make designs of buildings for public or for private purposes; I can also convey water from one place to another.

'I will also undertake any work in sculpture, in marble, in bronze, or in terra-cotta: likewise in painting I can do what can be done as well as any man, be he who he may.

'I can execute the bronze horses to be erected to the nemory and glory of your illustrious father, and the re-owned house of Sforza.

'And if some of the above things should appear to any ne impracticable and impossible, I am prepared to make xperiments in your park or in any other place in which it nay please your Excellency, to whom I most humbly reommend myself,' &c.

There is no date to this letter, but it was probably ritten about 1483, or perhaps earlier; it is written from ight to left, as are all the manuscripts of Lionardo, and is n the Ambrorian Library at Milan.

The duke took Lionardo into his service, with a salary f 500 scudi per annum. Why he chose to leave Florence s not known: he had made several propositions for the nprovement of the city and the state, which were not stened to. This however may have had no such influence pon him as to make him leave Florence. One of his proositions was to convert the river Arno, from Florence to isa, into a canal.

Though Lionardo devoted more time to painting than to anything else, he did not make many designs before he went to Milan. The following are mentioned by Vasari:—a Cartoon of Adam and Eve, for the king of Portugal, to be worked in tapestry in Flanders; it was considered in its time to have been the best work that had ever been produced; a painting of the Madonna, in which there was a vase of flowers admirably painted; it was afterwards purchased at a great price by Pope Clement VII.: a design of Neptune, drawn in his car by sea-horses, surrounded by tritons and mermaids, with other accessaries: and the head of an Angel, which was in the Palazzo Vecchio. Da Vinci's application was indefatigable; he sketched from memory striking faces that he saw in the streets; witnessed trials and executions for the sake of studying expression; invited people of the labouring class to sup with him, told them ridiculous stories, and drew their faces: some of these drawings were published by Clarke, in 1786, from drawings by Hollar, taken from the Portland Museum. He painted also before he went to Milan the Medusa's Head, now in the Florentine gallery. The silly story told by Vasari that the duke of Milan invited Lionardo to go and play the lyre and sing to him, is an imputation on the common sense of the duke, that he could send, and an insult on the manly character of the painter that he could accept, such an invitation. Lionardo does not even mention music in his letter to Ludovico, although he was accounted the best performer on the lyre of his age. In Milan, besides performing many and various services for the duke, Lionardo established for him an academy of the arts about 1485, and formed a great school. His first public work in the arts was the model for a bronze equestrian statue of Francesco Sforza, mentioned in his letter. He painted also for Ludovico portraits of his two favourites, Cecilia Gallerani and Lucrezia Crevelli: there is a copy of the former in the Milanese gallery; the second is said to be in the Louvre at Paris (No. 1091).

When the duke went to meet Charles VIII. at Pavia in 1494, Lionardo accompanied him, and he took that opportunity of studying anatomy with the celebrated Marc Antonio della Torre, with whom he became on very friendly terms. Lionardo made many anatomical drawings in red chalk for Della Torre; and Dr. Hunter, who examined some of them in one of the royal collections in London, says in his Lectures, published in 1784, that they are most minutely correct. About the year 1495 Lionardo wrote a treatise upon the respective merits of painting and sculpture, and dedicated it to the duke, but it is now lost.

All the various works executed or written by Lionardo da Vinci cannot be mentioned in a short notice. The bare enumeration of the titles alone of his treatises, of which he wrote several at this period, would occupy much space. In 1496 he painted a picture of the Nativity, which Ludovico presented to the emperor Maximilian the same year, at Pavia; it is now in the gallery at Vienna.

In 1497 he commenced his celebrated painting of the Last Supper, on a wall of the refectory of the Dominican convent of the Madonna delle Grazie. This work, the greatest that had then appeared, was copied several times while it was in a good state, and it is well known from Frey's, Morghen's, and other numerous engravings of it. One of the best copies is that in the Royal Academy of London, made by Marco Oggioni, purchased by Sir Thomas Lawrence in Italy: there are twelve old copies still extant. It was restored by Bellotti in 1726. There was nothing of the original work remaining at the end of the last century, except the heads of three apostles, which were very faint: it was nearly destroyed about fifty years after it was painted; and some French soldiers in the time of the Revolution finished its destruction by amusing themselves with firing at the various heads in it. It was painted in some new manner in oil, and its rapid decay has been attributed to the imperfect or bad vehicles used by Lionardo. This was the last work of importance in painting which Lionardo executed in Milan. He was obliged to leave that place without having cast his great equestrian statue of Ludovico's father, Francesco Sforza: the mould was ready, and he was waiting only for the metal; but this Ludovico was not able to give him; he required 200,000 pounds of bronze. The affairs of the duke were in so bad a state, that he could not even pay Lionardo his salary, which, in 1499, was two years in arrear; but he made him a present of a small freehold estate near the Porta Vercellina. After the duke's flight from Milan in that year, before Louis XII. of France, Lionardo had no longer any reason for staying there; but when he saw his works destroyed by the French, who broke up his model for the statue of Francesco Sforza, he left the place in disgust, and returned to Florence in the year 1500, accompanied by his favourite scholar and assistant, Salài, and his friend Luca Paciolo. He was well received by Pietro Soderini, the gonfaloniere, who had him enrolled in the list of artists employed by the government, and fixed an annual pension upon him. His first great work was the Cartoon of St. Anne, for the church of the Annunziata, a work which created an extraordinary sensation, but Lionardo never executed it in colours. He made also about the same time the celebrated portrait of the Madonna Lisa, the wife of Francesco del Giocondo, a work that has been praised perhaps more than it deserves; it is infinitely inferior in style and execution to his own portrait at Florence. Francis I. of France gave 4000 gold crowns for it, and it is now in the Louvre at Paris.

In 1502 he was appointed his architect and chief-engineer by Cesare Borgia, captain-general of the pope's army, and he visited in that year many parts of the Roman states in his official capacity; but in 1503, after the death of Pope Alexander VI., he was again in Florence, and was employed by Soderini to paint one end of the council-hall of the Palazzo Vecchio. Da Vinci selected for this purpose the battle in which the Milanese general Nicolo Picinino was defeated by the Florentines at Anghiari, near Borgo San Sepulchro. This composition, of which Lionardo made only the cartoon of a part, was called the Battle of the Standard; it represents a group of horsemen contending for a standard, with various accessories. Vasari praises the beauty and anatomical correctness of the horses and the costume of the soldiers. Da Vinci is said to have left this work unfinished, on account of jealousy of the more masterly and interesting design of the rival cartoon of the young Buonaroti for the same place. [TUSCAN SCHOOL.] In 1507 Lionardo again visited Milan, and painted in that year, in an apartment in the palace of the Melzi at Vaprio, a large Madonna and Child, which is in part still extant. He painted about the same time also the portrait of the general of Louis XII. in Italy, Giangiacopo Triulzio, which is now in the Dresden gallery. He visited it again in 1512, and painted two portraits of the young duke Maximilian, the son of Ludovico il Moro. He again left it in 1514, with several of his companions, and set out, by Florence, for Rome, on the 24th of September of that year. He arrived at Rome in the train of the duke Giuliano de' Medici, the brother of Leo X., by whom he was introduced to the pope. Leo at first took little notice of Lionardo, but upon seeing a picture of the Holy Family which he had painted for Baldassare Turini da Pescia, the pope's almoner, he gave him a commission to execute some works for him. Seeing however a great apparatus, and hearing that the painter was about to make varnishes, Leo said, 'Dear me, this man will never do anything, for he begins to think of the finishing of his work before the commencement.' This want of courtesy in the pope, and the circumstance of his sending for Michel Angelo to Rome, offended Da Vinci, and he left Rome in disgust, and set out for Pavia to enter into the service of Francis I. of France, known to be a great patron of the arts, and to have a great esteem for Da Vinci, some of whose works he possessed. Francis received him with the greatest kindness, and took him into his service, with an annual salary of 700 crowns. Da Vinci accompanied him to Bologna, where he went to meet Leo X., and afterwards, in the beginning of 1516, he went with him to France, whither, if it had been possible, Francis would have also taken the famed picture of the Last Supper, but it could not be removed from the wall, upon which it was directly painted.

Da Vinci's health after he left Italy was so enfeebled that he executed little or nothing more. Francis could not prevail upon him to colour his cartoon of St. Anne, which he had brought with him; nor did he show himself at all disposed to commence any new work which would require the exertion of his energies. His health gradually grew worse, and he died at Fontainebleau on the 2nd of May, 1519, aged sixty-seven, not seventy-five, as Vasari and others after him have stated. Vasari relates, that he died in the arms of Francis I., who happened to be on a visit to him in his chamber, when he was seized with a paroxysm which ended in his death. Amoretti, in his Life of Lionardo, has endeavoured to show that this story of Vasari's is a fiction, but the reasons he gives for his opinion do not in any way tend to prove it such. Lionardo's will and many other documents concerning him are still extant in the Ambrosian Library at Milan, where his manuscripts are likewise preserved. Lionardo was a man of proud disposition, of very sumptuous habits, and of a remarkably handsome person, which he always took great care to adorn with the most costly attire; in his youth also he was a great horseman. From the manner in which he always lived, his means must have been great, yet the rate of payment he received upon some occasions was very small, his salary when employed by the gonfaloniere Soderini was fifteen gold florins per month; but he was possessed of some property which he inherited from his family, from his father and an uncle; the estate also which was given to him by Ludovico il Moro, though small, must still have been of considerable benefit to him; he had likewise an estate at Fiesole. Half of the former he left to his servant Da Vilanis, and the other half, with the house, to Salài, his favourite assistant; the latter to his brothers. His library, manuscripts, his wardrobe at Cloux, and all things relating to his art, he bequeathed to his scholar and executor Francesco Melzi. The furniture of his house at Cloux near Amboise he bequeathed to Da Vilanis.

This great painter had three different styles of execution. His first was much in the dry manner of Verrocchio, but with a greater roundness of form: his second was that style which particularly characterises what is termed the school of Da Vinci; it consists in an extreme softness of execution, combined with great roundness and depth of chiaro'scuro, together with a fullness of design; in this style are the works which he executed in Milan: his third differed but in essentials from his second, but was characterised by a greater freedom of execution and less formality of composition; of this style the best specimen is his own portrait in the Florentine gallery, a work equal in every respect to the finest portraits of Titian.

No man borrowed less from other men than Lionardo Da Vinci; he might almost be called the inventor of chiaro'scuro, in which, and in design, he was, in the earlier part of his career, without a rival. Both Fra Bartolomeo in his tone and mellowness, and Michel Angelo in his grandeur of design, were anticipated by Vinci. Previous to Fra Bartolomeo, Michel Angelo, and Raphael, with the exception perhaps of those of Masaccio, no works had appeared that could in any respect be compared with those of Da Vinci. Lionardo's works are not numerous; his occupations were too various to allow him to paint many pictures. There can be no doubt that many of the works attributed to him in various galleries are the productions of his scholars or imitators, as Bernardino Luino, Francesco Melzi, and Andrea Salài; or Marco Oggioni, Gian Antonio Beltraffio, Cesare da Sesto, Pietro Ricci, Lorenzo Lotto, Niccolo Appiano, and others. The picture in the National Gallery, of Christ Disputing with the Doctors, is one of these doubtful works, or perhaps undoubtedly not the work of Lionardo.

Of Lionardo's numerous treatises few have been published. The best known is that on painting, 'Trattato della Pittura,' of which several editions have been published; it has been twice translated into English. In 1651 a very splendid edition was published at Paris by Du Fresne, with engravings from drawings by Nicholas Poussin. The work is divided into 365 short chapters, and contains such a mass of instruction, that subsequent writers have had to do little more than reiterate in different words the precepts of Da Vinci. Lionardo's greatest literary distinction however is derived, says Mr. Hallam, 'from those short fragments of his unpublished writings that appeared not many years since; and which, according at least to our common estimate of the age in which he lived, are more like revelations of physical truths vouchsafed to a single mind, than the superstructure of its reasoning upon any established basis. The discoveries which made Galileo, and Kepler, and Maestlin, and Maurolicus, and Castelli, and other names illustrious, the system of Copernicus, the very theories of recent geologers, are anticipated by Da Vinci, within the compass of a few pages, not perhaps in the most precise language, or on the most conclusive reasoning, but so as to strike us with something like the awe of præternatural knowledge. In an age of so much dogmatism, he first laid down the grand principle of Bacon, hat experiment and observation must be the guides to ust theory in the investigation of nature. If any doubt ould be harboured, not as to the right of Lionardo da Vinci to stand as the first name of the fifteenth century, which is beyond all doubt, but as to his originality in so many discoveries, which probably no one man, especially n such circumstances, has ever made, it must be on an ypothesis, not very untenable, that some parts of physical cience had already attained a height which mere books do not record.' The extracts alluded to above were published at Paris in 1797, by Venturi, in an essay entitled Essai sur les Ouvrages Physico-Mathématiques de Léonard da Vinci, avec des Fragmens tirés de ses Manuscrits aportés de l'Italie.' These manuscripts were afterwards estored to Milan, where they are still preserved under the ame of the 'Codice Atlantico.' It is said that Napoleon arried these and Petrarch's 'Virgil' to his hotel himself, ot allowing any one to touch them, exclaiming with delight, 'Questi sono miei' (these are mine). They were ollected together by the Cavaliere Pompeo Leoni, who rocured most of them from Mazzenta, who had them from he heirs of Francesco Melzi, to whom Lionardo bequeathed hem. They came eventually into the hands of Count Galeazzo Arconauti, to whom James I. of England is said o have offered 3000 Spanish doubloons for them (nearly 0,000*l.*), but this patriotic nobleman refused the money, nd presented them to the Ambrosian Library.

(Vasari, *Vite de' Pittori*, &c.; Lomazzo, *Idea del Tempio della Pittura*, &c.; Amoretti, *Memorie Storiche su la Vita, gli Studi, e le Opere di Lionardo da Vinci;* Lanzi, *Storia Pittorica*, &c.; Gaye, *Carteggio inedito d'Artisti;* Brown, *Life of Leonardo da Vinci*, &c.; Hallam, *Introduction to the Literature of Europe*, &c.)

VI'NCULUM, a name given in algebra to the line, rackets, parentheses, or other symbol, by which various erms are compounded into one, or supposed to be so compounded, in order that the result may be further operated on. As in

$$\overline{a+b+c}\,x \quad , \quad (a+b+c)\,x \quad , \quad \{a+b+c\}\,x \ , \ \text{\&c.},$$

which are, by the vinculum, prevented from being confounded with $a+b+cx$.

VINDE'LICI. [VINDELICIA.]

VINDELI'CIA, the antient name of a tract which contains parts of the present countries of Suabia and Bavaria in Southern Germany. It extended from the Lacus Brigantinus, now Lake of Constance, or Bodensee, to the north-east as far as the junction of the Inn with the Danube, and from the northern frontier of Rhaetia in the south to the Danube in the north. The adjoining provinces were Helvetia in the south-west, Roman Germany in the west, Independent Germany in the north, Noricum in the east, and Rhaetia in the south. In the Roman division of the provinces Vindelicia at first was a part of Rhaetia, which was conquered by Tiberius during the reign of Augustus; from the time of Diocletian it was a separate province, and was called Rhaetia Secunda, which name was gradually supplanted by the name Vindelicia, which is first mentioned by Sextus Rufus (c. 8). The name of Vindelicia is derived from the Vindelici, a warlike tribe in the southern mountainous part of the country; and it is believed that this tribe had its name from the Vindo or Vinda, also called Virdo, now Wertach, and the Licus, now Lech, which were two of the principal rivers of the country. The other rivers were the Danube, Oenus or Aenus, now Inn; Isarus or Isargus, now Isar; Ambro, now Amber; Guntia, now Günz; and the Ilargus, now Iller, which separates Suabia from Bavaria.

The original inhabitants of Vindelicia were undoubtedly of Celtic origin. The principal tribes were the Vindelici; the Isarii, on the Isar; the Licates, on the Lech; the Brigantii, near the Lake of Constance; and a great number of Boii, who settled between the Inn and the Isar after they had been driven from their homes in Bohemia by the Marcomanni. The Romans founded many colonies in Vindelicia, a great number of which still exist, and their present names are generally corruptions of the Roman names. The first in rank among them was Augusta Vindelicorum, now Augsburg, probably the 'splendidissima Rhaetiae provinciae colonia' of Tacitus, for he mentions no name (*Germania*, 41); Campodunum, now Kempten; Guntia, now Günzburg; Brigantia, now Bregenz; Vimania, or Vemania, now Wangen; Juliomagus, now Dütlingen (?); Brigobanna, now Beyern (?); Reginum, or Castra Regina, now Ratisbon, or in German, Regensburg; Batava Castra, now Passau, at the confluence of the Inn and the Danube; Pons Oeni or Aeni, now Mühldorf, on the Inn, which must not be confounded with Aeni Pons, or Oenipontum, the Latinized name of Insbruck in the Tyrol. The municipal rights given to these colonies by the Romans, which some of them preserved during all the popular troubles of the following centuries, were the cause of their afterwards becoming free Imperial towns, the number of which was greater in those provinces which were formerly occupied by the Romans than in any other part of Germany. From the third century Vindelicia was constantly invaded by German tribes, and during the fourth and fifth centuries it was entirely occupied by the Alemanni and Boioarii, and the antient population was completely exterminated, except perhaps some inhabitants who became serfs of the conquerors, and were then Germanized.

(Strabo, p. 206-7, Cas.; Ptolemy, ii. 12, 13, ed. Basil., 1541; Mannert, *Geographie der Griechen und Römer;* Cellarius, *Notitia Orbis Antiqui;* D'Anville, *Compendium of Antient Geography.*)

VINDEMI'ATRIX. [VIRGO.]

VI'NDHYA MOUNTAINS. [HINDUSTAN, xii., 211.]

VINE. [VITIS.]

VINEGAR, a dilute acetic acid obtained by the vinous fermentation. [FERMENTATION.] In countries which produce wine, vinegar, as its name imports, is obtained from the acetous fermentation of wine; but in this country it is usually procured from malt, and the process employed resembles the first stages of the brewer's operations. [BREWING.] The malt is ground and mashed with hot water. The wort, after being cooled, is transferred to the fermenting tun, where by the addition of yeast it undergoes the acetous fermentation; and when this is over, the liquor is transferred to small vessels, which are kept warm by means of a stove: in this it remains for a shorter or longer period, according to the temperature of the stove and the strength of the liquor. The process of acetification is assisted by introducing into the casks with the wort what is called *rape*, which is a quantity of the residuary fruit which has served for making domestic wines, or has been preserved by the vinegar-maker from one process to another in his own factory. The use of the rape is to act as an acetous ferment, and thus induce sourness in the wash, it being well impregnated with vinegar and continually kept sour. Acetification is sometimes carried on by transferring the wort, after it has undergone the vinous fermentation, into casks, the bungholes of which are left open and loosely covered with tiles; the casks are then exposed for a long time to the air; but the use of stoves has greatly superseded this mode, and has abridged the time of the operation and rendered it less liable to failure. The vinegar, after it has reached its greatest degree of sourness, is rendered clear and fit for use either by subsidence or the employment of isinglass. The manufacturer is allowed by act of parliament to mix $\frac{1}{1000}$ of its weight of sulphuric acid with vinegar; and what is termed by the Excise *proof vinegar* contains 5 per cent. of real acetic acid.

Vinegar may be prepared in small quantities from the fermentation of a solution of sugar mixed with yeast; or it may be obtained by the fermentation of various fruits; thus the juice of good apples contains a sufficiency of sugar to afford tolerably good vinegar without any addition.

In France vinegar is made from poor wine; and there are two kinds—the white, prepared from white wine; and the red, by the acetification of the red wine: these are finer flavoured and somewhat stronger than the malt vinegar of this country. (Donovan's *Domestic Economy; Cabinet Cyclopædia.*)

VINEGAR, *Medical Properties of.* Vinegar produces very different effects according to its degree of concentration; its effects are also different on the dead and living organic tissues. It acts as an effectual preservative from the putrefactive fermentation of dead organic tissues, and is hence employed as the means of forming pickles, or meat in a dried state, by simply immersing the substance in it for a few minutes. Wood vinegar, or pyroligneous acid, is most efficacious for this purpose, owing to the creasote present in it. Crude pyroligneous acid is one of the most effectual applications to timber, both to prevent the dry-rot and the ravages of insects. Concentrated acetic acid acts on the living tissues as a caustic poison; applied to the skin it causes heat, redness, and rapid inflammation. The same is the case when taken into the mouth or applied to any mucous membrane, which it blackens like sulphuric acid. When properly diluted and used in moderation, it heightens the vitality of the stomach and greatly promotes the digestive powers. Indeed free acetic acid is one of those always present in the stomach in a healthy state, and the substitution of lactic acid for it in that organ is one of the most common accompaniments of indigestion, especially in bilious persons. The peculiar property which vinegar possesses of dissolving gelatine points out the propriety of employing it as a condiment when veal or other young meats, or fish, are taken. Its powers are heightened by having aromatic or pungent principles dissolved in it, such as chillies or taragon. In cases of slow digestion the moderate use of vinegar impregnated with these is much to be commended; but their abuse of it is to be reprobated, as productive of serious evils. This is seen in the case of ladies who employ vinegar to retain a slender figure, and who thereby induce organic diseases, even cancer of the stomach. Vinegar assists the digestion of crude vegetables, and is appropriately used for salads. Its power over the nervous system is seen in cases of poisoning with narcotic poisons and in cases of drunkenness. In the former case care must be paid that the narcotic substance is completely evacuated from the stomach before administering it, otherwise much injury may result from a powerful acetate being formed. But after the removal of the poison nothing combats more effectually the secondary symptoms than vinegar, especially if coffee be dissolved in it. Few things will restore a drunken man to his senses more speedily than giving him vinegar to drink, hence the popular custom of putting pickles into the mouth of a drunken person.

Vinegar acts as a refrigerant and as a grateful drink in fever. It may be applied externally likewise to the palms of the hands of consumptive persons, to cool the hectic flush and prevent the subsequent clammy perspirations. In cases of commencing anasarca, or loss of tone of the skin in advancing life, vinegar is a very useful wash. In a concentrated form it is beneficial in some forms of ringworm of the scalp; though crude pyroligneous acid is preferable, owing to the creasote which it contains. The vapour of strong acetic acid, simple or aromatised, is a powerful restorative when applied to the nostrils in impending fainting, or as a means of relieving headache. It was formerly regarded as a disinfectant, or a protection against plague and similar diseases, but it merely overpowers and does not destroy unwholesome odours; free ventilation is therefore preferable. Acetic acid acts as a powerful solvent both of gum resins, the action of which it thereby increases, such as assafœtida and other vegetable principles, such as those of colchicum, synil, &c., and also of metallic oxides, such as copper.

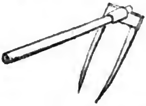
In case of poisoning by strong acetic acid, chalk should be instantly administered. The vapour of acetic æther carefully introduced by a suitable apparatus through the Eustachian tube into the ear is very efficacious in restoring hearing in cases of nervous deafness. (Pilcher, *On the Ear*.) Strong acetic acid, either alone or having the active principle of cantharides dissolved in it, furnishes a ready means of forming a blister.

VINEYARD. The vine only thrives in particular climates, where the autumns are not excessively hot, nor the springs subject to late frosts. It has been observed in France, that the line which marks the northern boundary of the vineyards is not parallel to any circle of latitude; but that it lies obliquely, advancing more to the north on the eastern boundary of the country than on the western. It seems to depend more on the nature of the climate in spring and autumn, than in summer and winter. A hard frost at the time the sap is quiescent has no bad effect on the vine, but rather the contrary; while a late frost in spring disappoints all the hopes of the vine-grower. There was a time when the vine was cultivated in England for the purpose of making wine; and whether the climate is altered, or the foreign wines have superseded the sour home-made wines, no one now attempts to cultivate the vine except for the purpose of obtaining grapes for the table, and the mode of cultivation is a branch of horticulture.

It may however be interesting to know how the vine is cultivated in the countries which produce good wine: of which France is one of the principal and nearest in climate to England. The vine grows best in a soil where few other shrubs or plants would thrive, and it seems a wise distribution of Providence, that where there is the best soil for wine, there it is the worst for wheat, and vice *versâ*. The vine delights in a deep loose rocky soil, where its roots can penetrate deep into fissures, so as to insure a supply of moisture when the surface is scorched by the sun's rays. On the steep slopes of hills towards the south and sheltered from the north-east, the grapes attain the greatest maturity, and the vintage is most certain. So great an influence has a favourable exposure, that in the same vineyard the greatest difference exists between the wine made from one part and that made from another, merely because there is a turn round the hill, and the aspect varies a very few degrees. A change of soil produces a similar effect. The famous Rhine wine called Johannisberg, when made from the grapes which grow near the castle, is worth twice as much as that made a few hundred yards farther off. Here both soil and aspect change. The *Clos de Vougeau*, which produces the finest Burgundy, is confined to a few acres; beyond a certain wall the wine is a common Burgundy, good, but without extraordinary merit.

The best vineyards in Europe formerly belonged to monasteries, and the quality was then thought of more importance than the quantity: of late the demands of commerce have made the quantity the principal object; and to this the quality is frequently sacrificed.

When a vine is first established on any spot where none grew before, the first thing is to prepare the ground for planting. In steep places, where the soil might be carried away by rains in winter or spring, terraces are formed by building massive stone walls along the slope, and levelling the soil behind them. The walls serve to reflect the heat and form a shelter to the vine below. Thus a whole hill is sometimes covered with terraces from top to bottom, and there the wine is generally good, if the exposure is favourable. Limestone, gravel, or coarse sand, with a small mixture of clay, forms a good soil for a vine. Vegetable substances alone should be used to enrich it, such as the leaves and tendrils of the vine, the residue of the grape when pressed, and, failing these, the leaves of trees collected when green, and formed into a compost with earth. The ground should be well trenched, if it will admit of it, or loosened with the mattock and pickaxe, as we should do a mass of gravel, which was to be spread on a road, and which was too hard for the shovel or spade. The different parts of the soil should be intimately mixed, keeping some fine earth or soil at top to set the plants in. When the ground is prepared, holes are dug in rows four or five feet wide, at the same distance from each other, so as to alternate; some of the finest of the soil is put into each hole, and the vine-plants, which have been rooted in a nursery, or else simple cuttings, are carefully inserted, pressing the mould round the roots and levelling the earth round them. Rooted plants will bear the second or third year, but cuttings take a much longer time. The season for planting is during the winter, when the weather is open. If cuttings are used, they are taken off the vine on which they grew at the usual time of pruning after the vintage; a piece of the preceding year's wood is left on the cutting, and when it is planted, the end where the old wood is left is bent or twisted to facilitate its striking: three or four eyes are buried, so that the end is a foot at least under ground. If the plant is already rooted, care is taken not to wound or bend the roots, but to spread them out and cover them with mould. During all the time that the vine is growing, the ground must be regularly cultivated and kept perfectly clear of all weeds. The usual instrument of tillage in stony and rocky soils is a two-pronged fork fixed in a short handle, at an angle less than a right angle with the prongs, which are a foot long, and very



ong, like a double pickaxe (see figure). This is struck o the ground and then drawn towards the workman, while handle is lifted, which acts as a lever in raising the soil. e roots are by this means enabled to spread through soil in search of moisture and food. The next year it usual to prune the young vine down to one or at most o eyes or buds; but some experienced vine-dressers ommend deferring this operation to the second year, which, although the vine will not be so forward in ating, it will be much strengthened, and fully repay the parent loss of time in the end.

n the third year the vine is trained, that is, the shoots tied to upright stakes planted at each root, or they laid in an arch and tied from one root to another along ground. In southern climates trees are planted at a tain distance from each other, and the vine, planted their foot, is allowed to run up their branches, from ich it is led in festoons from tree to tree, while the ad and branches of the tree are cut off to prevent too ch shade. This is by far the most elegant mode of ining the vine; but in France the stakes and the low ining are the only methods suitable to the climate. e pruning is generally done in the beginning of winter. When vineyards are established in the plains, where metimes, as those of Medoc, they produce very good ne, the intervals between the plants can be stirred by e plough, although forking and digging by hand is more mmon; hoeing is as necessary in a vineyard to destroy eeds as it is in a field of turnips or any other crop sown rows. Wherever a vineyard is overrun with weeds, u may be sure that there is no good wine, and much overty in the proprietor. The pruning of a vine in bearg, the object of which is to produce much fruit without eakening the plant, can only be learnt by experience and actice; much of the success of a vineyard depends on is operation. In the best vineyards no manure is used, cept that which we mentioned before, of leaves and ndrils; but some soils require to be recruited, and without manure would produce little or no wine. In this case ere is no alternative, and composts must be formed, is done in common cultivation, with animal and vegeble substances mixed and decomposed. Horse-dung ould be avoided, if possible: cow-dung is cooler and ore nearly of a vegetable nature; this should be mixed ith as much virgin earth from pastures and meadows as n be procured, and laid in small heaps in the intervals etween the rows. It may be left a little while, if it has y rank smell, and then forked in round the roots; the ore it is decomposed the better. Many a vineyard has st its reputation after having been abundantly manured. he Johannisberg was much reduced in value, after ving been dunged, while in the possession of General ellerman, and it has not yet regained all its former putation.

After a certain time, which differs in different situations, e vine becomes less productive from the exhaustion of e soil, as is the case when the same crops are repeatedly own in the same ground: this depends on the depth of the il. All perennial plants shoot out their roots farther and rther every year in search of fresh earth, and it is by his means that trees flourish for a long time on the same pot; but if the roots are prevented from spreading, or, he plants being too crowded, their roots interfere, a diminution of vigour is the consequence. So it is with the ine. In some situations, where the roots strike in crevices f rocks in which rich earth has accumulated, the vines ill continue in vigour for many years; but where their gress is arrested by a solid rock or substratum, they ill in time show signs of exhaustion. In this case the emedy is the same as for land bearing corn. A fallow, or est, as it is usually called, is necessary, together with the ddition of such manures as shall restore the lost fertility. For this purpose a portion of the oldest roots are dug up very year, and the ground trenched or loosened two feet eep or more with the mattock, to expose it to the influence of the atmosphere. A compost is prepared with ods taken from pastures, or any virgin earth which can be procured; this is mixed with some lime and turned over several times, to rot all the roots and grass which may be in it, and to make it a uniform and rich mould. Holes are now made, exactly as when a new vine is planted, and in each of them a basket or barrowful of earth is thrown; in this the new plants or cuttings are planted to produce new vines in due time: thus the vineyard is gradually renovated. The proportion thus fallowed every year depends on the natural duration of the vine in that particular situation. In inferior soils one-seventh is thus renewed every year, in some a twentieth part is sufficient, and there are vineyards which have never been renewed in the memory of the present generation, but these are few in proportion to the rest.

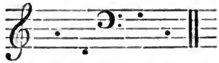
VIOL, an antient musical instrument, which is traced back as far as the eighth century, and may be considered as the parent of all modern instruments of the violin family.

The Viol was a fretted instrument, of three sorts—treble, tenor, and base, each furnished with six strings, and played on by a bow. The Treble Viol was rather larger than our violin, and the music for it was written in the treble clef. The Tenor Viol was in length and breadth about the size of the modern viola, but thicker in the body, and its notation was in the soprano or c clef. The Base Viol scarcely differed in dimensions from our violoncello: the music for it was written in the base clef.

'Concerts of viols,' says Sir J. Hawkins (iv. 339), 'were the usual entertainments after the practice of singing madrigals grew into disuse; and these latter (*i.e.* viols) were so totally excluded by the introduction of the violin, that at the beginning of the eighteenth century Dr. Tudway was but just able to give, in a letter to his son, a description of a Chest of Viols. He tells us that it 'was a large hutch with several apartments and partitions in it, each lined with green baize. Every instrument was sized in bigness according to the part played upon it; the least size played the treble part,' &c. The humorous Thomas Mace, of Cambridge, in his 'Music's Monument' (p. 245), says, 'Your best provision (and most complete) will be a good chest of viols, six in number, viz. two bases, two tenors, and two trebles, all truly and proportionably suited. Of these the highest in esteem are by Bolles and Ross (one bass of Bolles' I have known valued at 100*l*.). These were old; but we have now very excellent workmen, who (no doubt) can work as well.'

VIOL DA GAMBA (or properly, *Viola di Gamba*), *i.e.* the *leg-viol*, so called from being held between the legs, was the last survivor of the family of viols, and did not entirely fall into disuse till the latter part of the eighteenth century. In form and dimensions it resembled the modern violoncello, but had six strings. The tone was nasal and disagreeable, and the instrument is so thoroughly supplanted by the violoncello, that in all likelihood its restoration will never be attempted.

VIOLA, or TENOR-VIOLIN, a larger kind of violin, to which the part between the second violin and base is assigned. It has four gut strings, the two lowest covered with silver wire, which are tuned A, D, G, and C, an octave above the violoncello: or



VI'OLA, a genus of plants, the type of the natural order Violaceæ. This name is derived from the Latin word Viola. This genus has the following characters:—Sepals unequal, all more or less drawn out downwards into ear-like appendages, erect after flowering; petals unequal, convolute in æstivation, with 3-nerved claws, the lower one drawn out downwards into a hollow spur; stamens approximate or coarctate, inserted on the top of the teeth of a pentagonal 5-toothed torus; the filaments dilated at the base, oblong or triangular, bearing the anthers low down, lobes of anthers spreading at the base, the two anterior stamens bearing on their back two nectariferous, lancet-shaped, rotund or linear appendages, which are drawn in within the spur; the ovary sometimes superior, sometimes girded round at the base by a concave torus, and in this case the ovary appears half inferior; the valves of the capsule are elastic, contracting when ripe and ejecting the seeds; seeds horizontal, carunculate, more or less egg-shaped and shining; the embryo oblong; the radicle terete; cotyledons flattish, and scarcely longer than the radicle. The species of this genus are exceedingly numerous, above 160 having been described. They are elegant low herbs, for the most part perennial, rarely annual. The leaves are alternate. The peduncles are solitary, axillary, 1-flowered, furnished with two little bracteæ. The flowers are drooping.

In subdividing this large genus, many characters have been taken; that of M. Gingins, who arranges the species according to the form of the stigmas, has been adopted by Don in Miller's 'Dictionary.' Professor Edward Forbes, in a paper in the first volume of the 'Transactions of the Botanical Society,' has pointed out the value of the form of the nectariferous appendages, in conjunction with other characters, in subdividing this genus. On this subject he observes—'To group the violets according to the form of the nectary, without considering the relation of that form to the other characters of the plant, would be to arrange them artificially and not naturally; for then we should have such violets as *ochroleuca* and *prionantha* associated with the pansies, and other combinations of a similarly unnatural character. But associating the form of the nectaries with that of the leaf, with the colour and with the geographical distribution, we obtain a very natural arrangement of the species. The odorous and hairy violets, presenting short lancet-shaped nectaries, cordate leaves, often being hairy, and frequently nearly orbicular, purple-blue flowers, no stem, and a centralization of the species in North America, form a first group. The same form of appendage, but usually more developed as to length, combined with a cordate or lanceolate leaf, smooth, or slightly hairy; a stem, purple-blue or cerulean flowers, and an almost equal distribution in the Old and New Worlds, indicate a second equally natural, which may be represented by *V. canina*. *V. palustris* is the type of a third, and *V. biflora* of a fourth; the former associating a reniform leaf with a rotund appendage and a cerulean flower, and the latter a similar leaf, with an abbreviated lancet-shaped appendage and a yellow flower. The linear nectary, combined with a yellow flower and cordate leaves, forms a fifth; parallel with which may be placed (sixth) such as have pinnate leaves, blue flowers, and linear nectaries. Lastly, the pansies (*V. tricolor*) form a most natural group (seventh) of themselves, presenting us with flowers of all colours, linear nectaries, leaves peculiar to themselves, lyrate stipules, and a centralization in the mountainous countries of the western portion of the Old World.' Professor Forbes has not published his arrangement of the species, and we shall here give a description of a few of the best known and most remarkable, independent of any arrangement.

V. odorata, Common Sweet Violet, has no stem, a hooked naked stigma; crenated, smoothish, roundish-cordate leaves; ovate, obtuse sepals, the two lateral petals with a hairy line; the spur very blunt; the capsules turgid, hairy; the seeds turbinate, whitish, the stoles creeping, long, rooting. This plant is a native throughout the whole of Europe, and in Siberia and China. It is common in England, but is a rare plant in Scotland and Ireland. Wherever this plant grows, its delicious scent has made it a great favourite. Wine is said to have been flavoured with its flowers by the Romans, and the sherbet of the Turks is composed of syrup of violets mingled with water. Although a rare plant now in Scotland, it appears to have been used in that country at one time as a cosmetic. Sir William Hooker observes, 'I do not know where the Highland ladies of former times obtained their violets to make a cosmetic.' Yet it was known to them, if the following lines given by Lightfoot are correctly translated from the Gaelic: 'Anoint thy face with goats' milk in which violets have been infused, and there is not a young prince upon earth who will not be charmed with thy beauty.' The violet is held in great estimation by the Mohammedans. Their prophet has said of it, 'The excellence of the extract of violets above all other extracts is as the excellence of me above all the rest of creation.' It is much cultivated on account of its scent in gardens, and there are several varieties known and described. Some of them have double flowers, which is the case in the variety known as the Neapolitan violet.

V. hirta, the Hairy Violet, has no stem, the whole plant villous or pubescent; the stigma hooked, acute, naked; the leaves cordate; ovate, obtuse, ciliated sepals; stipules with glandular teeth; the two lateral petals bearded along the middle; the spur somewhat conical; the nectaries glabrous, lancet-shaped; the capsules turgid, hairy; the seeds turgid, brown. It is a native of thickets and groves throughout the whole of Europe, and is not uncommon in England, though rare in Scotland. It is chiefly found in chalky or limestone soils. Its flowers are of a lighter lilac colour than the last, and are scentless. It varies much in habit, as well as in the shape of its leaves, according to soil and situation. Two or three varieties have been recorded. After flowering, its flower-stalks elongate, and, taking a downward direction, carry the ripening capsules two or three inches below the surface of the soil.

V. canina, Dog's Violet, has an herbaceous ascending channelled stem; cordate acute leaves; serrated or finely-jagged stipules; entire awl-shaped bracts and sepals; glabrous peduncles; elongated capsules, with acuminated valves and pearl-shaped brown seeds. This plant is common in Britain, and is a native of hedges, thickets and heathy grounds throughout almost all Europe, in Japan, Persia, the north-west coast of North America, and the Canary Islands. The flowers are blue and scentless. Several varieties are recorded. Many of the related species have white or cream-coloured flowers.

V. palustris, the Marsh Violet, has jointed scaly roots; a marginate stigma; smooth cordately kidney-shaped leaves; broad ovate-acuminate stipules; ovate-obtuse sepals; two lateral petals, with a hairy central line; oblong trigonal capsules; ovoid dark-greenish seeds. This plant is a native throughout Europe in mossy bogs and humid meadows. It is more abundant in Scotland than England. There is a variety found in North America with purple flowers and almost orbicular petals.

V. clandestina, Clandestine Violet, has jointed scaly roots; almost orbicular leaves, bluntish, crenato-serrate, with glandular serratures; branched peduncles with from two to eight flowers; linear petals scarcely longer than the calyx; nectaries rotund. This is an American species, and occurs on the high mountains of Pennsylvania in shady beech-woods among rotten wood and rich vegetable mould. It is remarkable for producing its flowers under the rotting leaves and light mould in which it grows. The flowers are small, and of a chocolate-brown colour. The inhabitants of the districts where it grows call it heal-*all*, and they are in the habit of using it as an application in the cure of wounds and ulcers.

V. lactea, Cream-coloured Violet, has an ascending stem, with ovato-lanceolate glabrous leaves, dentate stipules, and acuminate bracts. It is a native of boggy heaths in Switzerland, France, and Britain. It is by some considered only a variety of V. palustris. *V. biflora* is a native of Europe and North America, and has a 2-flowered stem with small yellow flowers, the lip being streaked with black.

V. Canadensis, Canadian Violet, is a smooth plant, with cordate, crenated, acuminate leaves, with downy beneath, lanceolate, entire, awl-shaped sepals; entire petals; very short saccate spur; blunt capsules; and roundish, ovate chestnut-coloured seeds. It is a North American species, from Canada to the Carolinas. The flowers are purple-blue outside, white inside, elegantly veined, and sweet scented.

V. tricolor, Three-coloured Violet, Heart's-ease, or Pansy, has a somewhat fusiform root; diffuse branched stem; lower leaves ovato-cordate, deeply crenate; runcinate pinnatifid stipules, with the middle lobe crenated; spur thick, obtuse; nectaries linear. This plant is a native of cultivated fields and gardens throughout Europe, Siberia, and North America. The petals vary exceedingly in colour and size, and this tendency has been taken advantage of by the floriculturist for producing varieties of this flower, and at the present day there is no flower receiving more attention than the pansy. In consequence of this a great number of varieties are known in gardens, but even in their wild state they vary so much, that botanists have described upwards of twenty wild varieties. Some however of these varieties may, with more careful examination, turn out to deserve the rank of species. For the cultivation of this plant see Pansy. Long before this plant was so great a favourite with florists, it had received much attention, as its popular names indicate. Our English name pansy is derived from the French *pensée*, as it is considered a token of remembrance. Shakspere says, 'There's *pansies*, that's for thoughts.' But in this sense it always conveys a mournful impression. 'May they be far from thee,' is the motto which the French attach to little packets of these flowers. Our English word *heart's-ease* has a much more cheerful signification. Its three colours obtained for it among Roman Catholics the name herb-

inity. It was at one time used in medicine, but is arcely ever employed now. It seems to possess the pro:rties of the whole family, all of which possess more or ss activity as medicinal agents.

V. lutea, Yellow Mountain Violet, or Yellow Pansy, has fibrous slender root; simple triangular stems; ovate, long, crenate, fringed leaves; lyrate subpalmato-pintifid leaves. This plant is a native of moist mountains pastures in Wales, the north of England, and Scotland. flowers are yellow, marked with blackish branched liating lines; the lateral petals are palest, the two per ones sometimes purple. When all are purple, oker thinks this is the *V. amœna* of authors. There several other species of Viola, of which *V. tricolor* y be considered the type, which have yellow and purple wers, and which, by cultivation, are susceptible of ange: these are mostly called pansies.

In their geographical distribution the species of violet materially influenced by climate. 'The species from pical countries,' says Professor Forbes, 'are mostly from alities where the influence of elevation has neutralised modified the climatical influence. The various sections the genus have geographic centres, as may be seen in congregations of the allies of *hirta* in North America, d of those of *tricolor* in Alpine Europe. North America y be looked upon as the capital of the whole genus, ce we find there representatives of all its subdivisions. the following table the distribution of seventy-five ecies, according to the form of their nectaries, is exoited:—

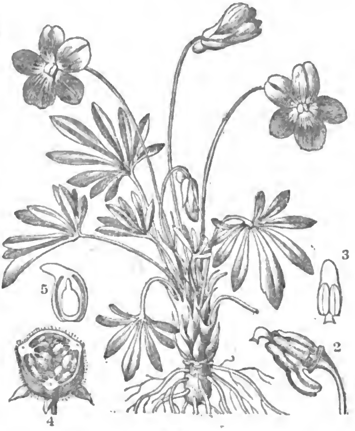
Nectaries	Europe.	Asia.	Africa.	America: North.	America: South.	Australia.	Total.
ancet-shaped	19	4	1	22	1	1	48
otund . .	2	0	0	1	0	1	4
inear. . .	12	4	1	6	0	0	23

There are hardly any species of violet that do not deve cultivating on account of the beauty of their flowers, t the varieties of *odorata*, the sweet-scented species, and *color*, are the great favourites. 'The hardy perennial ecies are well adapted for ornamenting rockwork or the nt of flower-borders, but the smaller species should be own in small pots in a mixture of loam, peat, and plenty sand. The American species do best in vegetable mould peat; those species which are natives of woods are ll adapted for growing under trees, and those natives of gs or marshes should be planted in moist situations. ey are all readily increased by seeds and parting the ants at the root. The annual species may be sown on e open border or on rockwork. The greenhouse and ve species should be grown in a mixture of loam and at, the herbaceous kinds of them should be increased by iding at the root or by seeds, and the shrubby kinds ould be propagated by cuttings, which will root freely if anted under a hand-glass; those of the stove species, in at.' (G. Don.)

(*Transactions of Botanical Society*, vol. i.; Hooker's *itish Flora*; *Cyclopædia of Plants*; Don's Miller's *ictionary*; Bischoff, *Lehrbuch*.)

VIOLA'CEÆ, or VIOLA'RIEÆ, a natural order of ants belonging to Lindley's parietose group of polytalous Exogens. It has the following essential chacters:—Sepals 5, persistent, with an imbricate æstivation, ually elongated at the base. Petals 5, hypogynous, ual or unequal, usually withering, and with an obliquely nvolute æstivation. Stamens 5, alternate, with the petals casionally opposite them, inserted on a hypogynous disk, ten unequal; anthers bilocular, bursting inwards, either parate or cohering, and lying close upon the ovary; laments dilated, elongated beyond the anthers; two in e irregular flowers, generally furnished with an appenage or gland at their base. Ovary 1-celled, many-seeded, r rarely 1-seeded, with 3 parietal placentæ opposite the outer sepals; style single, usually declinate, with an blique hooded stigma. Capsule of 3 valves, bearing the lacentæ in their axis. Seeds often with a tumour at their ase; embryo straight, erect in the axis of fleshy albumen. Lindley.) The species are herbs, undershrubs, or shrubs with alternate rarely opposite leaves, simple, usually involute before expansion, and all furnished with stipules. The lowers are erect or drooping, axillary, seated on peduncles, which are 1-flowered, solitary or numerous, sometimes branched.

Violaceæ are related to Polygalaceæ through a genus called Hymenanthera, which Brown refers to the former order, but Lindley to the latter. It is also closely related to Droseraceæ, but differs from that order in the style being solitary in their elongated embryo, involute vernation, and stipulate leaves. From Passifloraceæ it is distinguished by its capsular not baccate fruit, in its hypogynous stamens and single stigmas. The order is divided into two tribes, Violeæ and Alsodineæ. The former chiefly inhabit Europe and America; the latter, with the exception of the genus Pentaloba, are natives of South America and Africa.



Viola pedata

1. Entire plant; 2, corolla and calyx of flower removed, to show the anthers and nectary; 3, stamen; 4, section of capsule; 5, section of seed showing embryo.

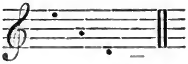
All the Violaceæ possess in a greater or less degree emetic properties, which reside principally in their roots: the principle on which this property seems to depend has been separated by Boullay from some species of Viola, and has been called Violina. Its external characters are similar to those of emeta, which is obtained from true Ipecacuanha: hence it is that many of the plants belonging to this order are used as substitutes for true Ipecacuanha. The Viola odorata is admitted into the Edinburgh and Dublin Pharmacopœias for the purpose of making a syrup of the flowers, which is used on account of its scent, and is administered to children as a laxative: it is also used as a test of acidity and alkalinity, being rendered green by alkalis and red by acids. The genus *Pombalia* has the sepals large, with prickly margins; the lower petal long, somewhat gibbous at the base: the stamens free, and two of the filaments with a nectarial gland. The capsule is like Viola. There is but one species of this genus, the *P. Itubu*, White Ipecacuanha. This plant was formerly called Ionidium Itubu. Several varieties are recorded, some of which have been placed under the genus Viola. In using the roots of this plant as an emetic, from one to three drachms must be administered, so that it is less active than the brown Ipecacuanha of *Callicocca* and *Cephaelis*, and of other plants used as substitutes. It is a native of Brazil, where it goes by the name of *Poaya da praia*, or *Poaya branca*, and is sold for the true Ipecacuan. *Itubon* is the name of this plant in Guiana. It is used as a remedy in dysentery and gout.

The genus *Ionidium* is known by possessing unequal sepals, the lower petal large, rather gibbous, or concave at the base; the stamens approximate, the two anterior with a nectary. There are about forty species of this genus: the *I. parviflorum* and *I. Poaya*, the one a native of Peru, the other of Brazil, are both used as substitutes for true Ipecacuanha.

VIOLIN (*Violino*, It., *a small viol*), a musical instrument known, in some shape, as used with a bow, in nearly all parts of the world, justly boasts of having existed in very remote times. Medals of the highest antiquity, M. Charles informs us (*Cours d'Acoustique*), representing Apollo playing on a three-stringed instrument closely resembling the violin, still exist. We have never met with any of these; though it seems improbable that the antients should not have discovered that the sounds of the lyre admitted of uninterrupted prolongation, by means of that kind of friction which so simple a machine as the bow produces; and a lyre, or lute, acted on by a bow, instead of a plectrum, may be considered as a violin, or, at least, as the parent of all instruments of the violin tribe.

But a very diligent and trust-worthy antiquary, the Abbé le Beuf, has produced a strong proof that the violin—or perhaps rebec [REBEC]—acted on by a bow, was known in France during the eighth century, and thus has left little if any doubt of the use of the instrument from that period, however uncertain we may be as to its previous existence. The Welsh cruth, or crwth, or crowd, which pretends to great antiquity, seems originally to have partaken more of the form and character of the harp than of the violin. The cruth of a later period was however certainly a violin, with gut strings, and played on by a bow. (See *Hudibras*, I. ii. 105.)

The modern violin has four gut strings, the last, or lowest, covered with silver-wire. These are tuned in 5ths, E, A, D, G; or,

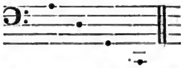


M. Baillot (lately deceased), one of the finest performers of our time, in his *Méthode* for the violin, adopted by the *Conservatoire de Musique*, says that the compass of the violin exceeds three octaves. Supposing this to signify three octaves and a half, the legitimate extent of the instrument will be from G, the fourth space in the base, to the octave above the second added line in the treble. But we cannot refrain from expressing our wish that violinists would confine themselves within a more limited compass. The highest sounds of the instrument are disagreeable to most ears; are often harsh, and almost always squeaking; and though they display a kind of mechanical skill in the performer, they, in most instances, betray his vanity and want of true taste.

When complete, says M. Otto (instrument-maker to the court of Weimar), in his *Treatise on the Construction, &c. of the Violin*, this instrument consists of fifty-eight different parts, or pieces: but such small divisions are not indispensably necessary, for in many instruments of a cheap description the parts are not so minutely divided. 'The wood is generally of three sorts. The back, neck, sides, and circles are of sycamore: the belly, bass-bar, sound-post, and six blocks, of deal: the finger-board and tail-piece of ebony.' The finest violins now in use were made by one family, living in Cremona. [CREMONA.] The oldest came from the hands of Hieronymus Amati, at the commencement of the seventeenth century. He was followed by Antonius Amati, about the middle of that century; and succeeded by Nicolas Amati, towards the end of the same. To these is to be added Antonius Straduarius, of Cremona also, who was contemporary with the two latter of the Amatis. And last, Joseph Guarnerius, at the beginning of the eighteenth century. 'All their instruments,' M. Otto adds, 'were constructed after the simplest rules of mathematics (?), and the six which came into my possession *unspoilt*, were made after the following proportions:—The belly was thickest where the bridge rests; then it diminished about a third at that part where the *f* holes are cut; and, where the belly rests on the sides, it was half as thick as in the middle. The same proportion is observed in the length. The thickness is equally maintained all along that part on which the bass bar is fixed: thence to the upper and under end blocks the thickness decreases to one-half, so that the cheeks are three-fourths the thickness of the breast, and the edges all round only one-half. These proportions are best adapted for imparting a full, powerful, and sonorous tone. The back is worked out much in the same proportion as the belly.'

Steiner, of Apsam, is also celebrated for his violins. 'They differ,' M. Otto tells us, 'from the Cremonese, both in shape and tone. They are higher modelled, and their proportions of strength are calculated quite differently. A Cremonese has a strong, reedy tone, something like that of a clarionet, while a Steiner approaches that of a flute.' The same author also gives the names of many German violin-makers; but as they are not generally known out of their own country, we cannot afford any space to them, but refer our readers to the translation of M. Otto's work, by Mr. Fardeley of Leeds.

VIOLONCELLO (a diminutive of *Violone*, Ital., a *contra-basso*, or double-base), a musical instrument of four gut strings, the two lowest covered with silver-wire, and tuned in 5ths, A, D, G, and C; or,



This fine rich instrument is an improvement of the viol *da gamba*, the latter having formed one of the family of viols. [VIOLS.] England may justly claim the merit of having given birth to the best performers on the violoncello that Europe has produced; and still possesses one (Lindley), who, during a period of forty years, has well maintained his country's supremacy in this department of art.

VIOTTI, GIOVANNI-BATTISTA, the first violinist of his time, according to general opinion, and the acknowledged founder of a school of which Rode, Mori, Libon, Labarre, Pixis, Alday, &c. were disciples, was the son of the chief gardener to the Prince di Carignano, and born in 1755, at Fontanento, a village in Piedmont. His father intended him for a line of life very different from that which his own inclination marked out; but, as usually happens in such cases, parental wishes were combated by a natural propensity too strong to be resisted, and the youthful enthusiast was placed under the instruction of Pugnani, to whom all aspiring violinists looked up, and whose skill may be justly inferred from the celebrity which his pupil attained. At the early age of twenty he was chosen to fill the situation of first violin in the royal chapel of Turin, an appointment of great professional rank, in which he remained three years; he then commenced his European travels, and made a lengthened visit to Berlin. He afterwards proceeded to Paris, where, by the grandeur and elegance of his performance, and the originality and beauty of his compositions, he speedily acquired a most brilliant reputation, which never lost any of its lustre, and he still ranks there as the father of that noble style which a vicious thirst for novelty has, for the present, cast into the background; though, like all that is intrinsically good, it will revive when pure taste shall resume its sway; or, perhaps we ought to have said, when what is forgotten will appear new.

In the early part of the French revolution, when it was deemed right that every class should be represented in the legislative body, Viotti was elected into the Constituent Assembly, for good sense, shrewdness, and firmness were remarkable features in his character: but when the reign of terror commenced, he, disgusted and alarmed, fled to the English shores, and made a most successful début at one of Salomon's concerts. He afterwards took some share in the general management of the King's Theatre, but from this he soon retired; his genius fitted him better for the particular duty of leader of the band, in which office he superseded Mr. William Cramer, who had, during many years, filled it in an entirely satisfactory manner. Viotti however did not long enjoy this appointment, for some envious, unknown enemy, by false representations to government, caused his being ordered, in 1798, to quit the country at a few hours' notice, and he retired to Hamburg, where he published his celebrated 'Six Duos Concertans pour deux Violons.' In 1801 he was allowed to return to London, and, finally abandoning his profession, embarked the whole of his small fortune in a partnership in the wine trade, by which hasty unguarded step he lost all. Louis XVIII. then offered him the direction of the Académie Royale de Musique, and he repaired to Paris; but he found himself as little qualified to direct the French opera as he had been to manage the Italian theatre in London; he therefore once more and finally settled in this country, meeting with an hospitable reception and an agreeable home in the house of a friend, where he mixed in the best society, including many persons of rank, literature, and science, that the metropolis afforded. In such intercourse he did not refuse to contribute occasionally his talents to he general stock of enjoyment, and even consented to become an active member and director of the Philharmonic Society, when in its palmy state, and while it continued in its independent and disinterested form, appearing as a dilettante in its orchestra, occasionally as a *principale*, but more frequently as a *repieno*, and uniting with Salomon, F. Cramer, Yaniewicz, Spagnoletti, Vaccari, &c. to produce such a musical phalanx as never before was witnessed, and probably will never again be assembled under one roof. His losses and disappointments however gradually affected his health, and he sank under them at Brighton on the 3rd of March, 1824.

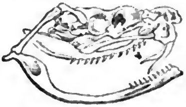
Viotti was an accomplished, elegant man, and his talents, is lively conversation, and his polished manners rendered im a desirable acquisition in the best circles, to which he hiefly confined himself. His compositions are, for the resent, laid aside, but, as we have above hinted, they may come forth again when they shall have novelty, in ddition to their intrinsic merit, to recommend them.

VIPER. [Viperidæ.]

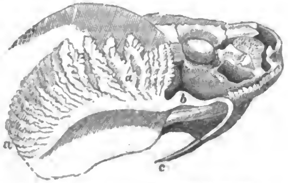
VIPE'RIDÆ. Among the great natural groups of ERTEBRATA, certain forms, with their concomitant habits, must have attracted the attention of man at a very early eriod. The broad line of distinction between the carnivorous and herbivorous mammals, and between birds of rey and the fruit-eating, seed-eating, and insectivorous ribes, must soon have been manifest; while self-preservaion would no less teach him to distinguish quickly beween the poisonous and harmless serpents.

The place of both these last in the system, as laid down y the highest zoological authorities, together with a geeral view of their organization, will be found in the ticles Reptiles and Serpents. Under the present title e propose to treat of terrestrial poisonous serpents genelly.

The machinery which enables the venom-snakes to inflict eir, often, fatal bite, as explained by Professor Owen, is ated at large in the last of the articles above referred to Vol. xxi., p. 276, *et seq.*]. Here therefore we shall only ve cuts explanatory of that machinery.



Skull of Rattlesnake: profile.



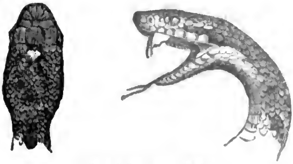
Tooth and poison-gland of Trigonocephalus mutus.

a, a, poison gland; b, duct; c, fang: the letter indicates the position of the it, from which the poison passes into the wound.

EUROPEAN VENOM-SNAKES.

Example, *Pelius Berus*, Merr.; *Vipera*, Ray; *Vipera ulgaris*, Latr.; *Vipera communis*, Leach; *The Common Viper.*

Description.—'The head,' says Mr. Bell, in his very accurate *British Reptiles*, 'is somewhat depressed, almost val, slightly widening behind the eyes. Gape as long as he head, extending behind. No teeth in the upper maxilary bones excepting the poison-fangs; a row of small eeth in the palatine bone on each side. Neck rather maller than the back of the head, from which the body ncreases to nearly the middle of the entire length; the est of the body to the vent scarcely diminishing; the tail becoming almost abruptly smaller, and tapering to its extremity, which is pointed: the tail varies in proportion to the body, but is generally not more than one-eighth of the total length, and in some even less. The head is covered with small squamous plates, which in some specimens are regularly formed and symmetrically placed; but in others they are very irregular. There are three which are larger than the others—namely, the vertical, and the pair of occipital plates. The scales of the back and sides are semi-oval or somewhat lanceolate, imbricated, and distinctly carinated. They are disposed in eighteen series. The plates of the abdomen have nothing particular in their form; they vary in number, but usually consist of about one hundred and forty to about one hundred and fifty, and those of the tail are about thirty-five pairs.'



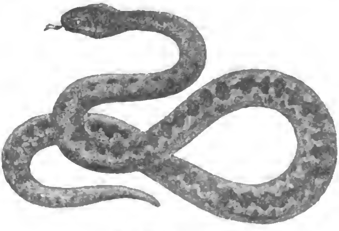
Head of the Viper. (Bell.)

'The general ground-colour,' says Mr. Bell in continuation, 'varies considerably. In some it is nearly olive, in others a rich deep brown, and in others a dirty brownish yellow; and when in high health, and shortly after having cast the skin, the surface is slightly iridescent in particular lights. A mark between the eyes, a spot on each side the hinder part of the head, and a zig-zag line running the whole length of the body and tail, formed by a series of confluent rhombs, as well as a row of small triangular spots on each side, all of a much darker hue than the ground-colour of the body, and frequently almost black. I have a specimen in my collection which I received alive from Hornsey Wood, the ground of which was almost perfectly white and all the markings jet black. The under parts are plumbeous in some, with lighter or darker spots, in others wholly black.'

Mr. Bell well remarks that the tendency of this species to vary in its colours has occasioned an erroneous multiplication of species by various authors, and he enumerates the following varieties:—

1. The Red Viper (*Vipera communis*, var. β. Jenyns).
2. The Black Viper (var. δ. Jenyns).
3. (?) The Cærulean or Blue-bellied Viper (var. γ. Jenyns; *Coluber cæruleus*, Sheppard): Mr. Bell thinks this hardly deserving of being considered a distinct variety, the plumbeous colour of the belly, by which it is characterized, being rather a difference of degree than of hue.
4. The Variegated Viper—that described by Mr. Bell from Hornsey Wood.

Dr. Leach, in his *Zoological Miscellany*, figures, but not well, the black variety, and says that the following species are to be referred to this:—*berus*, *chersea*, *aspis*, *prester*, Linnæi; *cæruleus*, Sheppard; *rufescens aut rufus*, Mus. Brit.



The Common Viper or Adder.

This is, not improbably, the Ἔχις (*Echis*) of Aristotle and the Greeks, and the *Vipera* of Virgil (*Georg.*, iii. 417), Pliny

(*Nat. Hist.*, viii. 39; x. 42; xi. 37), and the antient Italians. It is the *Marasso* of the modern Italians; *Vipère* of the French; *Hugg-orm* of the Swedes; and *Adder* (antiently written *nedre*, and later *eddre*, with the loss of the initial *n*, from the Anglo-Saxon *nædre*) of the country-people in many parts of England and Scotland.

Mr. Bell remarks that the Prince of Canino and Musignano figures, in his *Fauna Italica*, as the true *chersæa*, a small viper, considerably similar to our Red Viper, excepting in its colour, which is a light grey with darker markings. Mr. Bell notices in that figure the greater breadth of the head which is observable in our animal, together with a still more obtuse rostrum, and says that the Prince's figure is evidently taken from a young animal, which may possibly belong to a different species. Mr. Bell then adverts to the terms *marasso palustre* applied by the Prince to *Vipera berus*, and *marasso alpino* to his *Vipera chersea*, observing that this distinction is certainly not sustained by our two varieties. 'After all,' says Mr. Bell in conclusion, 'the question whether it be the *Coluber chersea* of Linnæus, and whether, if not so, this last-mentioned species be distinct from the Common Viper, is one of considerable doubt and obscurity.' Doubtful it may be; but still the diligence, acuteness, and experience of the Prince have long established a just confidence in his accuracy; and he has been very successful in working out the true specific forms indicated by Linnæus and others.

Geographical Distribution of the Common Viper.—Europe generally, from the North of Russia to the South of Italy and Spain. England and Scotland, but not Ireland.

Habits, &c.—'That the young Vipers,' says Brown, in his *Enquiries into Vulgar and Common Errors*, 'force their way through the bowels of their dam, or that the female viper in the act of generation bites off the head of the male, in revenge whereof the young ones eat through the womb and belly of the female, is a very antient tradition. In this sense entertained in the Hieroglyphicks of the Ægyptians, affirmed by Herodotus, Nicander, Pliny, Plutarch, Ælian, Jerome, Basil, Isidore; and seems countenanced by Aristotle and his scholar Theophrastus: from hence is commonly assigned the reason why the Romans punished parricides by drowning them in a sack with a viper; and so perhaps upon the same opinion the men of Melita, when they saw a viper upon the hand of Paul, said presently without conceit of any other sin, No doubt this man is a murtherer; who, though he have escaped the sea, yet vengeance suffereth him not to live. That is, he is now paid in his own way, the parricidous animal and punishment of murtherers is upon him. And though the tradition were current among the Greeks, to confirm the same the Latine name is introduced, *Vipera, quasi vi pariat*; that passage also in the Gospel, *O ye generation of Vipers*, hath found expositions which countenance this conceit. Notwithstanding which authorities, transcribed relations, and conjectures, upon enquiry we find the same repugnant unto experience and reason.'

The production of the young alive, so different from the birth of the generality of serpents, gave rise no doubt to one part of this tradition.

Gilbert White thus writes to Pennant from Selborne, on the 18th June, 1768:—'Providence has been so indulgent to us as to allow of but one venomous reptile of the serpent kind in these kingdoms, and that is the viper. As you propose the good of mankind to be an object of your publications, you will not omit to mention common salad-oil as a sovereign remedy against the bite of the viper. A neighbouring yeoman (to whom I am indebted for some good hints) killed and opened a female viper about the 27th of May. He found her filled with a chain of eleven eggs, about the size of those of a blackbird; but none of them were advanced so far towards a state of maturity as to contain any rudiments of young. Though they are oviparous, yet they are viviparous also, hatching their young within their bellies, and then bringing them forth. Whereas snakes lay chains of eggs every summer in my melon-beds, in spite of all that my people can do to prevent them, which eggs do not hatch till the spring following, as I have often experienced. Several intelligent folks assure me that they have seen the viper open her mouth and admit her helpless young down her throat on sudden surprises, just as the female opossum does her brood into the pouch under her belly, upon the like emergencies, and yet the London viper-catchers insist on it to Mr. Barrington that no such thing ever happens.'

On the 29th April, 1776, he writes from the same place to the Honourable Daines Barrington—'On August the 4th, 1775, we surprised a large viper, which seemed very heavy and bloated, as it lay in the grass basking in the sun. When we came to cut it up, we found that the abdomen was crowded with young, fifteen in number; the shortest of which measured full seven inches, and were about the size of full-grown earth-worms. This little fry issued into the world with the true viper-spirit about them, showing great alertness as soon as disengaged from the belly of the dam: they twisted and wriggled about, and set themselves up, and gaped very wide when touched with a stick, showing manifest tokens of menace and defiance, though as yet they had no manner of fangs that we could find, even with the help of our glasses.'

White then proceeds with his usual happy power of turning his observations to account:—'To a thinking mind nothing is more wonderful than that early instinct which impresses young animals with the notion of the situation of their natural weapons, and of using them properly in their own defence, even before those weapons subsist or are formed. Thus a young cock will spur at his adversary before his spurs are grown; and a calf or lamb will push with their heads before their horns are sprouted. In the same manner did these young adders attempt to bite before their fangs were in being. The dam however was furnished with very formidable ones, which we lifted up (for they fold down when not used) and cut them off with the point of our scissors. There was little room to suppose that this brood had ever been in the open air before; and that they were taken in for refuge at the mouth of the dam when she perceived that danger was approaching, because then probably we should have found them somewhere in the neck, and not in the abdomen.'

Whether the young take refuge down the throat of the mother is a question not easily answered. There is no physiological reason against it. The young might live in such a situation for some time: it is well known that frogs will live and cry in the stomach of a serpent. But the evidence of the viper-catchers is strong against the fact, and we have never met with any one who could state that he had actually seen the young enter or issue from their retreat, although we have conversed with several who have been assured by gamekeepers and gardeners that the fact had been witnessed by them. It is not improbable that when female vipers in the last stage of pregnancy have been surprised, and on being opened have disclosed living young, the spectators, not aware of the extreme thinness of the membrane which encloses them, and which a very slight pressure will suffice to rupture, have leapt to the conclusion that the young had entered the mouth for protection: such a suspicion seems for a moment to have crossed White's mind in the case last mentioned by him.

When a viper is about to strike, it is generally more or less coiled, and elevates the head and neck, which are drawn backwards, the former in a horizontal position. The head is then suddenly darted at the object of attack, and the erected tooth plunged into it and withdrawn with a motion almost too quick for the eye to follow. Unless very much irritated the serpent will not immediately repeat the bite, as if conscious that time is required for the renewal of the poisonous secretion, so as to make it sufficiently virulent. Neither will the snake waste its strength on an invulnerable object a second time. A viper was surprised and transfixed by a pitchfork. The agonized serpent instantly struck at the handle, but made no second effort, although long retained in its painful position.

We are not aware of any well-authenticated case of a person bitten by a viper terminating fatally; but we would by no means insure a person so wounded in the heats of summer or autumn, especially if the wound be inflicted on a naked part, and if he be of a bad habit of body. The remedy used by the viper-catchers was that noticed by White: they rubbed olive-oil on the part wounded, over a chafing-dish of coals, and took it also internally. Some of them would suffer themselves to be bitten by vipers full of 'sweltered venom,' confident in their remedy. Such cases will be found in the work of Dr. Mead, who proved the innocence of the poison when swallowed, by taking it himself without the slightest ill effect, an example not to ashly followed, for any recent injury to the gums, or skin of the mouth or throat generally, would render ı an experiment extremely hazardous from the vascu- y of the part. We do not attribute much virtue to the nal taking of the oil. Externally it is a specific, and ld be aided by doses of ammonia administered inter- /.

ogs are very liable to be bitten by vipers, at which ters will stand as if they were game, and so they will iakes. We once saw a bad case, where a favourite received a bite in one of his hind-legs from a virulent riper, in very hot weather, and had a hard struggle for ife. The injury yielded to the external application of -oil and doses of castor-oil administered as purgatives. ı a general rule it may be considered improbable that riper uses his offensive weapons in disabling his prey, h consists of frogs, lizards, mice, and (according to Mead) even moles. Nevertheless in some refractory ı it is very likely that the animal resorts to their use rrest the struggles of the victim, especially as the on is so speedily fatal to small animals. Vipers will a long fast, and have been boxed up for six months out abatement of their vivacity. Pennant states that feed only a small part of the year, but never during confinement; for if mice, their favourite diet, should at time be thrown into their box, though they will yet they never will eat them.

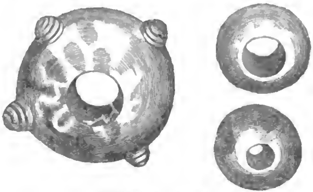
en the last generation witnessed the great demand hese poisonous serpents in consequence of the virtues osed to reside in their flesh. The lingering belief in wonderfully invigorating qualities of 'viper broth' is yet quite extinct in some places. Pliny, Galen, and rs praise the efficacy of viper flesh in the cure of rs, elephantiasis, and other disorders arising from a ipt state of the system. By the antients the animal generally served to the patient boiled like fish, as g more efficacious than when taken in the form of a ler or other dried state. Sir Kenelm Digby's beau- wife was fed on capons fattened with the flesh of rs.

England these reptiles were caught with a cleft or ed stick, which the viper-catcher drove down imme- ly behind the head, then seized the serpent by the tail, instantly put it into a bag. In this way the shops of apothecaries were supplied; and we remember hear- of the alarm produced in the house of one of these essionals of the last age by the escape of a whole col- on from the ill-closed box in which they arrived. A t black one was discovered coiled up between the ts of one of the beds just as its occupant was about ep into it.

pen copses, dry heaths, newly-cleared woodlands, and y wastes are the usual haunts of the viper, which, in er, is frequently found in its hybernaculum, intertwined ı several of its own species, and in an almost torpid e. These conglomerations may have given rise to the le in which the celebrated 'ovum anguinum' was pro- ed. Pliny indeed (*Nat. Hist.*, xxix., c. 3) attributes roduction to snakes convoluted together in the summer, notices the statements of the Druids with regard to mystic creation. Mason has not omitted to take ad- tage of this tradition in his 'Caractacus,' where the id sings—

> 'From the grot of charms and spells,
> Where our matron sister dwells,
> Brennus, has thy holy hand
> Safely brought the Druid wand,
> And the potent Adder-stone
> Gender'd 'fore the autumnal moon?
> When in undulating twine
> The foaming snakes prolific join;
> When they hiss and when they bear
> Their wondrous egg aloof in air;
> Thence before to earth it fall.
> The Druid in his hallow'd pall
> Receives the prize,
> And instant flies,
> Follow'd by the envenom'd brood,
> Till he cross the crystal flood.'

Pennant, who quotes these lines, as well as the passage m Pliny, says, 'Our modern druidesses give much the me account of the *ovum anguinum*, *Glain Neidr*, as e Welsh call it, or the *Adder-gem*, as the Roman philo- pher does, but seem not to have so exalted an opinion its powers, using it only to assist children in cutting eir teeth, or to cure the chin-cough, or to drive away an gue. We have some of these beads in our cabinet: they are made of glass, and of a very rich blue colour: some are plain, others streaked: we say nothing of the figure, as the annexed plate will convey a stronger idea of it than words.'



Adder-stones. (Pennant.)

ASIATIC VENOM-SNAKES.

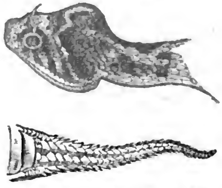
Example, *Naia tripudians.* [NAIA.]

AFRICAN VENOM-SNAKES.

Examples, *Vipera* (*Cerastes*) *caudalis*, Smith (*Vipera ocellata*, Smith).

Dr. Smith describes this poisonous snake as being, above, yellowish-red, spotted and variegated with other colours; and as of a pale rose-red, with a pearly lustre beneath. Along the back the spots are disposed in three irregular rows: those of the centre are oblong; those of the other two more or less circular. All are orange-brown, and some of them are partially, others completely edged with straw-yellow; those of the middle row being in the first condition, and only margined anteriorly and posteriorly; and those of the others mostly in the state last described, the majority of them having moreover a lilac-coloured point toward their centre. Sides of the body faintly freckled with small nebulæ, or irregular spots of the same colour as those of the back; but paler, without variegations, and rarely having the same position in any two specimens. Upper and lateral parts of the head similarly variegated, but disposed in angular or arrow-shaped markings on the top of the head, and in vertical bars on the sides. Those on the top of the head are generally two in number, one between the eyes and the other on the occiput, and both are commonly margined anteriorly with cream-yellow. The vertical bars are usually four on each side; three of them cut the upper lip, and the fourth generally terminates immediately behind the angle of the mouth. Besides the arrow-shaped marks on the top of the head, there are usually two or even more circular spots intermediate between the specified markings: these also are frequently edged with cream-yellow. Eyes reddish-orange.

Dr. Smith further states that the ground-colour of the upper parts of some individuals is much darker than that above stated, and differs but little from the tint of the spots, which, in such cases, are seen indistinctly. In others again the colour entirely differs, being steel or ashy grey, with much darker spots tinted with the same hue. The markings on the head, too, differ greatly.



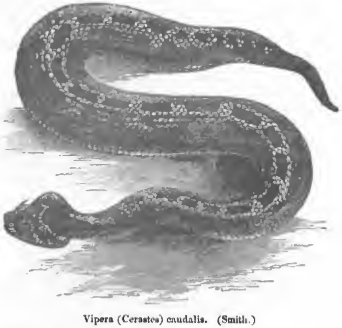
Head, and Tail (under side) of Vipera (Cerastes) caudalis. (Smith.)

The head is distinct; the body thick in proportion to its length; the tail short, tapered, and pointed. Angles of the jaws very divergent, giving greater width to the hinder part of the head, the anterior portion of which is narrower. Nose rounded; nostrils near its apex, each in the centre of a thick projecting scale. Eyebrows arched.

each armed near its middle with a slender, pointed, slightly recurved spine, about a line or a line and a quarter in length. Scales of anterior part of the head, particularly round the eyes, very small: those between and immediately behind the nostrils imperfectly carinated: on the hinder part of the head they are oval, as on the body, and distinctly carinated. On the back and sides they are arranged in longitudinal rows; and from the points of each row overlapping the base of those immediately behind them, the carinations form continuous ridges, about twenty-seven in number generally. Dr. Smith then enters into further minute details, for which we must refer the reader to the accurate and interesting work itself. The length of an adult is about fourteen inches.

Locality.—South Africa.

Habits, &c.—'Dry sandy districts,' says the same author, 'constitute the favourite *habitats* of this viper, which manifests all that indolence of character so remarkable among the various species of the genus, and on account of which they are more dreaded by the native of South Africa than even snakes possessed of more virulent poison, but disposed to action on the approach of danger. According to good testimony this species will continue for days together in one position; and as it never seeks to avoid danger, however imminent, its presence is rarely discovered unless when trampled upon, and the offending parts wounded by its fangs. Though generally inactive, it is by no means so when injured: its movements are then performed with activity; and when once it seizes the obnoxious object, it retains its hold with great determination, and some considerable exertion is often required to detach it. The same may be said of most of the vipers, in which respect they differ materially from *Naia*. The various species of the latter, immediately after they inflict a wound, detach themselves, and fly to a place of concealment; while the vipers, even when detached by force, continue upon the spot where they fall, or remove but slowly from it.' (*Zoology of South Africa.*)



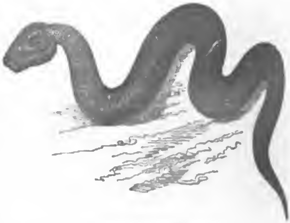
Vipera (Cerastes) caudalis. (Smith.)

Echidna inornata (Smith).

Description.—Back and sides dark yellowish-brown; belly brownish-yellow, sparingly sprinkled with brownish dots; tail above, indistinctly marked with dull brown spots or bars. Head oblong, heart-shaped. Length thirteen inches and a quarter. (Smith.)

Locality.—The specimen from which Dr. Smith wrote his description, which is minutely detailed in the work above quoted, was killed in the Sneeubergen, or Snow-mountains, immediately behind the village of Graaff Reynet.

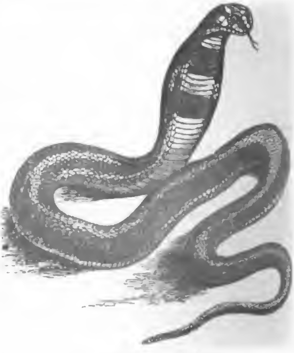
Habits, &c.—Dr. Smith states that little is known of the habits of this snake, save that, like the other species of the genus, it is indolent, and heedless of the approach of man. He records six species of the genus *Vipera* as inhabitants of South Africa, viz., *Vipera arietans*, Merr.; *V. atropos*, Latr.; *V. cornuta*, Daud.; *V. inornata*, Smith; *V. ocellata (caudalis)*, Smith; *V. atropoides*, Smith: or, if the subdivisions of Merrem and Wagler be adopted, *Echidna arietans*; *E. atropos*; *E. inornata*; *E. atropoïdes*; *Cerastes cornutus*; and *C. ocellatus (caudalis)*.



Echidna inornata. (Smith.)

Dr. Smith here again notices the fact that the vipers and one or two species of *Elaps* are the only snakes of South Africa which permit themselves generally to be closely approached without evincing any apparent concern. The others manifest a disposition to act on the offensive or to fly: even an unusual noise, without its cause being visible, is sufficient, he remarks, to insure the retreat of the innocuous ones.

The different species of *Naia* and the *Elaps lubricus*, Merr., are, he observes, always ready for the fight, and when their haunts are invaded, they often advance upon the intruder with the head and anterior part of the body almost perpendicular, the neck expanded, and an expression sufficiently indicative of the malignant purpose they have in view. 'To witness such a proceeding,' says Dr. Smith in continuation, 'once fell to my own lot. Walking in the vicinity of Graham's Town, I happened to excite the attention of a *Naia Hæmachates*, which immediately raised its head, and warned me of my danger by the strength of its expiration; it then commenced an advance, and, had I not retired, I should in all probability have suffered, provided I had not been fortunate enough to disable it, which possibly would not have happened, considering that the species, in common with others of the same genus, is extremely active. Even though I retired, I was not satisfied the danger was past, as the flight of the snake's enemy does not always put a stop to its advance when once commenced. An officer of the Cape corps, upon whose accuracy the most implicit reliance was to be placed, informed me that he once was chased twice round his waggon by an individual of the same species, and the pursuit might have been prolonged, had not a Hottentot disabled the enraged reptile by a blow from a long stick.'



Naia Haje (young)—Smith.

Dr. Smith figures three varieties of *Naia Haje* in his *Zoology* above alluded to; and the young state of the serpent, with the synonyms *Echidna flava*, Merr., *Naia* igra, Smith, *Geel copell*, *Bruin copell*, and *Spuugh-lang* of the Cape colonists.

He describes the majority of the Sonth African specimens as either entirely yellow or purplish-brown, though considerable number occur also in which both these coours exist more or less distinctly in the same individual. The depth of the general colour, he says, varies considerably in different specimens, particularly in the yellow nes, in which every shade between straw yellow and lear purplish brown may be observed. The general coour of the young is pale straw yellow, with two brownished collars on the throat, the extremities of each of which re visible upon the neck above; and those of the last ollar are generally connected by a narrow angular bar, of he same colour as the collar itself. The eyes are light hestnut-brown.

Dr. Smith remarks that if this reptile be specifically ifferent from the *Naia Haje* of Northern Africa, he had ot, after closely comparing them, been able to discover he differences which, in his opinion, could justify him in egarding them as distinct. He had not been able to pereive greater discrepancies between some of the Cape inividuals and those collected in Egypt, than he had found etween some of what may be regarded the more typical xamples of Southern Africa and others of the same counry, which may be viewed as presenting aberrant or less ommon characters. The young of the Cape reptile exctly corresponds, he observes, with the young of *Naia Haje*, as figured by M. Geoffroy. (*Egypte*, Atlas, pl. 7, ig. 3.)

he Spuugh-slang. Colour uniform livid blackish brown, the livid tinge strongest on the under parts, forming almost a purplish slate-colour, which is very dark and shining towards the head. (Smith.)

The variety most rarely met with, according to Dr. Smith, is the *Spuugh-slang* (spitting-snake) of the colousts, so named from its supposed power of ejecting its poison to a distance. All the cobra-de-capellas of Southern Africa, he remarks, distil poison from the points of their fangs when they are much irritated, and are able to eject a portion of it beyond the mouth by a forcible expiration; but that any power greater than that is possessed by the *Spuugh-slang*, Dr. Smith is not disposed to believe: the contrary nevertheless is, he allows, strongly maintained both by the European and native inhabitants. 'Both of these,' continues Dr. Smith, 'affirm that the snake in question is able to cast its poison to a distance of several feet, especially if the wind be blowing so as to favour its object; and that it often projects it into the eyes of unwelcome intruders, and thereby occasions a degree of inflammation which not uncommonly terminates in loss of sight. In the Cape colony the varieties of the cobra-de-capella are all regarded as highly dangerous; and many severe if not fatal consequences are the results of their bite. They are all savage and bold, and when assailed they generally resist rather than fly, and they not unfrequently even act upon the offensive. They climb trees with great facility, and often take to the water out of choice. In the liquid element their progress is rather slow, and during their residence in it the head and a portion of the neck is always kept raised above the surface. Whenever they are excited or irritated, they, like the common species of India, inflate the loose skin of the neck, and extend it laterally, so as to exhibit an appearance as if the neck was edged on each side with a thin semicircular appendage. They feed upon small quadrupeds, birds, and eggs, and in search of the latter they ascend trees to rob nests.' The general length of the South African *Naia* is between five and six feet.

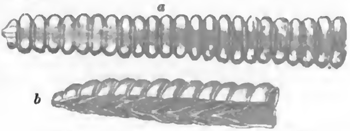
AMERICAN VENOM-SNAKES.

Crotalus, Linn.

Generic Character.—Scales on the head similar to those on the back; tail ending in a rattle; head subtriangular.

Example, *Crotalus horridus*, the Rattle-snake.

Description.—Colour of the head brown; eye red; upper part of the body yellowish-brown, transversely marked with irregular, broad, black lists. Rattle brown, composed of several horny, membranous cells, of an undulated pyramidal figure, articulated one within the other, so that the point of the first cell reaches as far as the basis or protuberant ring of the third, and so on; which articulation, being very loose, gives liberty to the parts of the cells that are inclosed within the outward rings, to strike against the sides of them, and so to cause the rattling noise which is heard when the snake shakes its tail. (Catesby.)



a, Rattle of twenty-four joints; *b*, section of rattle. (Catesby.)

Locality.—Virginia, the Carolinas, and other parts of America.

Habits, Food, &c.—Lawson, in his *History* (1714), says 'The Rattle-snakes are found in all the main of America that I ever had any account of; being so called from the rattle at the end of their tails, which is a connection of jointed coverings of an excrementitious matter, betwixt the substance of a nail and a horn, though each tegmen is very thin. Nature seems to have designed these on purpose to give warning of such an approaching danger as the venomous bite of these snakes is. Some of them grow to a very great bigness, as six feet in length, their middle being the thickness of the small of a lusty man's leg. We have an account of much larger serpents of this kind; but I never met them yet, although I have seen and killed abundance in my time. They are of an orange tawny, and blackish colour on the back; differing (as all snakes do) in colour on the belly, being of an ash-colour inclining to lead. The male is easily distinguished from the female by a black velvet spot on his head; and, besides, his head is smaller shaped and long. Their bite is venomous, if not speedily remedied; especially if the wound be in a vein, nerve, tendon, or sinew; when it is very difficult to cure. The Indians are the best physicians for the bite of these and all other venomous creatures of this country. There are four sorts of snake-roots already discovered, which knowledge came from the Indians, who have performed several great cures. The rattle-snakes are accounted the peaceablest in the world; for they never attack any one, or injure them, unless they are trod upon or molested. The most danger of being bit by these snakes is for those that survey land in Carolina; yet I never heard of any surveyor that was killed or hurt by them. I have myself gone over several of this sort, and others; yet it pleased God I never came to any harm. They have the power or art (I know not which to call it) to charm squirrels, hares, partridges, or any such thing, in such a manner, that they run directly into their mouths. This I have seen by a squirrel and one of these rattle-snakes; and other snakes have in some measure the same power. The rattle-snakes have many small teeth, of which I cannot see they make any use; for they swallow everything whole; but the teeth which poison are only four; two on each side of their upper jaws. These are bent like a sickle, and hang loose as if by a joint. Towards the setting on of these, there is, in each tooth, a little hole wherein you may just get in the point of a small needle. And here it is that the poison comes out (which is as green as grass) and follows the wound made by the point of their teeth. They are much more venomous in the months of June and July, than they are in March, April, or September. The hotter the weather the more poisonous. Neither may we suppose that they can renew their poison as oft as they will; for we have had a person bit by one of these, who never rightly recovered it, and very hardly escaped with life; a second person bit in the same place by the same snake, and received no more harm than if bitten with a rat. They cast their skins every year, and commonly abide near the place where the old skin lies. These cast-skins are used in physic, and the rattles are reckoned good to expedite the birth. The gall is made up into pills with clay, and kept for use, being given in pestilential fevers and the small-pox. It is accounted a noble remedy, known to few, and held as a great *arcanum*. This snake has two nostrils on each side of his nose. Their venom, I have reason to believe, effects no harm, any otherwise than when darted into the wound by the serpent's teeth.'

Catesby thus notices this species in 1771. 'Of these vipers,' says he, writing of all the American venom-snakes under that name, 'the Rattle-snake is most formidable, being the largest and most terrible of all the rest: the largest I ever saw was one about eight feet in length, weighing between eight and nine pounds. This monster was gliding into the house of Colonel Blake of Carolina; and had certainly taken his abode there undiscovered, had not the domestic animals alarmed the family with their repeated outcries, the hogs, dogs, and poultry united in their hatred to him, showing the greatest consternation, by erecting their bristles and feathers; and expressing their wrath and indignation, surrounded him, but carefully kept their distance; whilst he, regardless of their threats, glided slowly along.

'It is not uncommon to have them come into houses, a very extraordinary instance of which happened to myself in the same gentleman's house, in the month of February, 1723; the servant in making the bed in a ground-room (but a few minutes after I left it), on turning down the clothes, discovered a rattle-snake lying coiled between the sheets in the middle of the bed.

'They are the most inactive and slow-moving snake of all others, and are never the aggressors, except in what they prey upon; for unless they are disturbed they will not bite; and, when provoked, they give warning by shaking their rattles. These are commonly believed to be the most deadly venomous serpent of any in these parts of America; I believe they are so, as being generally the largest, and making a deeper wound, and injecting a greater quantity of poison; though I know not why any of the other kinds of vipers may not be as venomous as a rattle-snake, if as big, the structure of the deadly fangs being alike in all. The most successful remedy the Indians seem to have is to suck the wound, which, in a slight bite, has sometimes a good effect; though the recovered person never fails of having annual pains at the time they were bit. They have likewise some roots which they pretend will effect the cure; particularly a kind of *Assarum*, commonly called *Heart Snake-roots*, a kind of *Chrysanthemum* called *St. Anthony's Cross*, and some others; but that which they rely on most, and which most of the Virginian and Carolina Indians carry dry in their pockets, is a small tuberous root, which they procure from the remote parts of the country; this they chew, and swallow the juice, applying some to the wound. Having, by travelling much with Indians, had frequent opportunities of seeing the direful effects of the bites of these snakes, it always seemed and was apparent to me that the good effects usually attributed to these their remedies is owing more to the force of nature, or the slightness of the bite of a small snake in a muscular part, &c. The person thus bit, I have known to survive without any assistance for many hours; but where a rattle-snake with full force penetrates with his deadly fangs, and pricks a vein or artery, inevitable death ensues; and that, as I have often seen, in less than two minutes. The Indians know their destiny, the minute they are bit; and when they perceive it mortal, apply no remedy, concluding all efforts in vain. If the bite happeneth in a fleshy part, they immediately cut it out to stop the current of the poison. I could heartily wish that oil of olives applied to the wound might have as good success against the venom of these snakes as it hath been found in England to have had against the poison of the adder.' (*Carolina*.)

Lawson, it appears, was an eye-witness of the fascination, if so the effect of terror on the victim is to be termed, of the rattle-snake; and though Catesby never saw it, he thus details the evidence of the fact known to him:—

'The charming, as it is commonly called, or attractive power this snake is said to have of drawing to it animals and devouring them, is generally believed in America; as for my own part, I never saw the action; but a great many from whom I have had it related, all agree in the manner of the process; which is that the animals, particularly birds and squirrels (which principally are their prey), no sooner spy the snake, than they skip from spray to spray, hovering and approaching gradually nearer their enemy, regardless of any other danger; but with distracted gestures and outcries descend, though from the top of the loftiest trees, to the mouth of the snake, who openeth his jaws, takes them in, and in an instant swallows them.'

There can be little doubt that this supposed power is greatly exaggerated. That a suddenly-surprised animal should be arrested by terror and easily fall a victim to the serpent is highly probable; but that it should descend to its destruction from the top of the loftiest trees is almost incredible.

That the secretion of the poison may be greatly increased by local irritation would be expected, and Mr. Bell, in his *History of British Reptiles*, adduces the following evidence of the fact. He was dissecting very carefully and minutely the poison-apparatus of a large rattle-snake which had been dead for some hours; the head had been taken off immediately after death; yet as Mr. Bell continued his dissection the poison continued to be secreted so fast as to require to be occasionally dried off with a bit of rag or sponge. He states his belief that there could not have been less altogether than six or eight drops at the least.

The Rattle-snake.

The same scientific and entertaining author relates as a proof that the effect of wounds inflicted by venomous serpents subsequently to the first is greatly lessened, either by the diminution of the quantity of venom or of some deterioration of its strength, the following anecdote:—A gentleman of his acquaintance had received a living rattle-snake from America. Intending to try the effect of its bite upon some rats, he introduced one of those animals into the cage with the serpent, which immediately struck the rat and the latter died in two minutes. Another rat was then placed in the cage, and ran to the farthest corner from the snake, uttering cries of distress. The serpent did not attack it immediately; but after about half an hour, on being irritated, struck the rat, which exhibited no symptoms of being poisoned for several minutes, nor did it die till twenty minutes after the bite had been inflicted. A third rat, remarkably large, was then introduced into the cage, and exhibited no signs of terror, nor was it apparently noticed by its dangerous companion. After watching for the rest of the evening, Mr. Bell's friend retired, leaving the rattle-snake and the rat together. He rose early the next morning, and visited the cage: there lay the snake dead, and the rat had supped upon the muscular part of its back. Mr. Bell does not remember at what time of the year this took place, but he expresses his belief that it was not during very hot weather.

The length of time during which a man will linger after being bitten by one of these deadly snakes was manifested in a very distressing case which will perhaps be remembered by many of our readers. Some years ago a carpenter came to see a rattle-snake which was publicly shown for money in London. The man endeavoured to excite it, probably to hear its rattle, with his rule, which he dropped into the serpent's cage. As he was trying to ecover it the snake bit him in the hand. He was taken o one of our hospitals, St. George's if we recollect right, and bore up so long that hopes were entertained of his recovery; but his constitution gave way at last, and after many days he fell a victim to the poison.

Caudisona. (Fitzing.)

Subgeneric Character.—This form resembles the last, but the head is protected by plates.

Example.—*Caudisona miliaris. The Small Rattle-snake.*

Locality.—Same as that of *Crotalus horridus.*

Habits, &c.—The bite of this snake, though severe, does not, according to Catesby, always prove mortal.

Tisiphone. (Fitzing.)

Generic Character.—Head covered with plates to behind the eyes. Tail terminating in a spine.

Example.—*Tisiphone Shawii.*

This seems to be the *Horn Snake*, of which such marvellous stories are told. 'Of the horn-snakes,' says Lawson, 'I never saw but two that I remember. They are like the rattle-snake in colour, but rather lighter. They hiss exactly like a goose when anything approaches them. They strike at their enemy with their tail, and kill whatsoever they wound with it, which is armed at the end with a horny substance, like a cock's spur. This is their weapon. I have heard it credibly reported by those who said they were eye-witnesses, that a small locust-tree, about the thickness of a man's arm, being struck by one of these snakes at ten o'clock in the morning, then verdant and flourishing, at four in the afternoon was dead, and the leaves red and withered. Doubtless, be it how it will, they are very venomous. I think the Indians do not pretend to cure their wound.'

From the last sentence but one it appears that Lawson was not without his suspicions that fable hung about this story. Catesby, writing much later, says in his account of 'The Water Viper,' 'The back and head of this serpent are brown: the belly marked transversely with black and yellow alternately, as are the sides of the neck: the neck small: the head large, armed with the like destructive weapons as the rattle-snake; which, next to it, is reckoned the largest of any other viper in these parts; and, contrary to most other vipers, are very nimble, and particularly dexterous in catching fish. In summer great numbers of these serpents are seen lying on the branches of trees hanging over rivers, from which, at the approach of a boat, they drop into the water, and often into the boat on the men's heads: they lie in this manner to surprise either birds or fish; after these last they plunge, and pursue them with great swiftness, and catch some of a large size, which they carry on shore and swallow whole. One of these serpents I surprised coming on shore with a large Cat-fish having two sharp bones on each side of its gills, which were so fixed in the jaws of the snake, that he could not disengage himself with all his twists and distortions; and in that condition, being in danger of drowning, was necessitated to swim ashore, where the murderer was slain. This serpent in Carolina commonly goes by the name of *The Water Rattle-snake;* not that it hath a rattle, but many of them are very large, and coloured not much unlike the rattle-snake, and their bite is said to be as mortal. They frequent water, and are never seen at any great distance from it. The tail of this viper is small towards the end, and terminates in a blunt horny point about half an inch long. This harmless little point hath given a dreadful character to its owner, attributing to him another instrument of destruction besides that he had before; imposing a belief on the credulous, that he is the terrible Horn Snake, armed with death at both ends, though in reality of equal truth with that of the two-headed *Amphisbæna;* yet we are told that this fatal horn, by a jerk of the tail, not only mortally wounds men and other animals, but if by chance struck into a young tree, whose bark is more easily penetrable than in an old one, the tree instantly withers, turns black, and dies.'

Such are a few examples of the poisonous serpents that infest America.

AUSTRALIAN VENOM-SNAKES.

New South Wales is not without its share of these deadly reptiles. There is one viper frequent in the brush very like a burnt stick, which, as all the true vipers are indolent and do not remove upon the approach of persons, like others of the serpent tribe, makes it the more dangerous and the more liable to be trodden on.

Mr. Bennett, in his *Wanderings*, observes that snakes are very numerous in many parts of the colony. Those known as the 'black and brown snakes' are, he says, found about the banks of the rivers or in swampy situations: the natives, who are not however the best authority for the extent of danger produced by a venomous snake, according to Mr. Bennett, say that its bite is not deadly, but causes the person to feel sick and sleepy for a short time, which passes off without producing any further ill effects, even if no remedy be applied.

'It would be interesting,' continues Mr. Bennett, 'to institute experiments, so that the extent of danger attending the bites of the venomous reptiles in the colony might be ascertained with some degree of correctness. As far as regards this snake, I am well informed by persons who have been bitten, that the effects are as above stated; but still it would be interesting to know the degree of violence the poison is capable of producing in each of the venomous reptiles. I examined a "black snake," which had been just killed at the farm of Gudarigby, upon a "flat" near the river; it was of a shining silvery black colour above, the abdomen being dark red: it measured three feet and a half in length, and at its largest circumference three inches: it was a male specimen. The stomach was filled with a quantity of green frogs with golden spots (the *Rainette dorée* of Peron?), some having the appearance of being just swallowed, whilst others were half digested; there was also a mass of digested matter in which the remains of frogs could be distinctly seen. This snake appears to be a species of the genus *Acanthophis*. By the natives of Yas the Black Snake is called "Bulbuk."

'The "Brown Snake," which I examined, is also venomous, and, according to popular opinion, the effect very dangerous upon the human constitution. The specimen measured nearly five feet in length, and five inches at its largest circumference; the upper part of the body was of a brown colour (from which no doubt its name is derived), with a few light shades of black; the abdomen was of a light bluish black. In the stomach were found several half-digested lizards, and a quantity of worms, which in some parts had even perforated the coats; on a further examination, the lungs were also found perforated by, and had attached to them, a number of these worms, varying from one and a half to two inches in length, and of a bright red colour. I preserved them, together with the lungs, in spirits, and sent them to the Museum of the Royal College of Surgeons in London.'

Mr. Bennett further observes that both the Black and Brown Snakes take to the water on the appearance of danger; that they evidently procure their food from the banks of streams, and that they may be considered both land and water snakes.

The same author states that there is another dangerous snake, called 'Yellow Snake' by the colonists, and 'Jaruk' by the Yas natives, and describes its size as large and its reputation as being very venomous, the bite producing almost instant death. He relates the case of an overseer at Mulgoa who had been bitten by a *Yellow Snake* 'a few days since,' had undergone the operation of having the piece cut out, but who was, at the date of the account (Oct. 25, 1832), in a dangerous state.

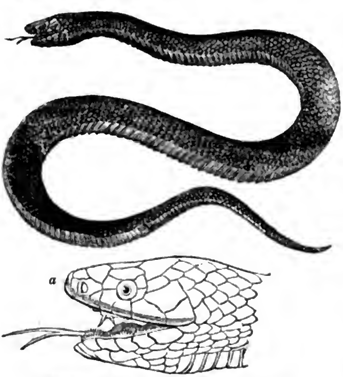
'The most deadly snake in appearance,' says Mr. Bennett, 'and I believe also in effect, is one of hideous aspect, called by the colonists *The Death Adder*, and by the natives *Tammin*, from having a small curved process at the extremity of the tail, or, more correctly, the tail terminating suddenly in a small curved extremity, bearing some resemblance to a sting, it is considered by popular rumour to inflict a deadly sting with it.* This hideous reptile is thick in proportion to its length; the eye is vivid yellow, with a black longitudinal pupil; the colour of the body is difficult to be described, being a complication of dull colours, with narrow blackish bands, shaded off into colours which compose the back; abdomen slightly tinged with red; head broad, thick, and flattened. The specimen I examined measured two feet two inches in length, and five inches in circumference. It is, I believe, an undescribed species. A dog that was bitten by one died in less than an hour. The specimen I examined was found coiled up near the banks of the Murrumbidgee river; and being of a torpid disposition, did not move when approached, but quietly reposed in the pathway, with its head turned beneath the belly.'

This amusing writer adds, that when cattle are bitten by a venomous snake, they are said to resort immediately to the water. A cow was found lying dead near the river, at Gudarigby, during the time he was visiting the farm, and from the appearances presented by the body the stock-keepers were of opinion that its death was caused by the bite of a venomous snake.

Acanthophis tortor, Less.

Formula:—ventral scales, entire, 190; anal, 2; caudal, entire, 5; and lateral, 48—48.

M. Lesson, who gives the above formula, remarks, in the *Zoologie de la Coquille*, that this serpent is not a true *Acanthophis* because its tail does not terminate in an unguiculate point. It ought, he thinks, to be arranged under the genus *Trimereseura* of Lacépède; but, nevertheless, he adds, it differs not in any of its other characters from the *serpents with a spiny tail*. He expresses his opinion that it is the same species as Dr. Leach has figured in his *Zoological Miscellany* (vol. i., tab. 3), under the name of *Acanthophis Brownii*.

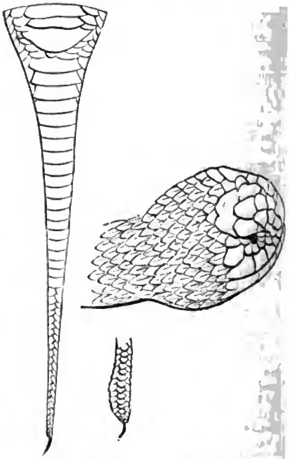


Acanthophis tortor, Less. Acanthophis Brownii, Leach? a, head. (Lesson.)

Neither Dr. Leach's description nor figure agrees with those of M. Lesson. The colouring is very different, and there is in Dr. Leach's figure a distinct unguiculate spine at the end of the tail. Dr. Leach says of *Acanthophis Brownii* that it was first noticed at New Holland by Robert Brown, Esq., F.R.S., &c., who described it in his MS. under the title of *Boa ambigua*, and he adds that he named the species after that gentleman as a tribute justly due to him, not only as one of the first botanists in Europe, but also as a gentleman zealous for the promotion of every branch of natural history. Dr. Leach states that the natives, according to the information of Mr. Brown and Mr. A. Huey, the latter of whom killed the specimen which Dr. Leach figured at Port Jackson, suppose it to be the most poisonous snake found in New Holland.

If M. Lesson be right in thinking that his serpent and that described and figured by Leach are identical, there is no excuse for changing the name. M. Lesson describes his *Acanthophis tortor*, or *Acanthophis Bourreau*, as remarkable for its lively colours. A black velvety blue is spread over the upper part of the body: rose-colour deepened into red takes its origin behind the jaws and extends along the sides to the vent. Pale yellow tinges the lower part of the body, but a brown circle occupies the centre of each ventral plate. The head and tail are uniformly blue-black. The length, according to the same author, reaches two feet nine inches, French. The four poison-teeth, two on each side, are small and very sharp.

Locality, Habits, &c.—M. Lesson states that this snake is very much diffused over New South Wales, where the colonists dread it much in consequence of the mortal wounds which it inflicts, and distinguish it by the name of *The Black Snake*. Its bite, he says, has often killed convicts in less than a quarter of an hour, if the reports of the inhabitants may be credited. It is, he adds, very common in the small woods and sandy heaths which surround Botany Bay, where M. Lesson states that he has often seen it in his excursions.



Head and tail of Acanthophis Brownii (Leach).

VIRA. The fine paid for different crimes and trespasses prescribed by the code of Novgorod, given by Yaroslaf I., was called Vira. It was evidently of Teutonic origin, as the same fines were called Wera in the Saxon and old English laws.

VIRE, a town in France, capital of an arrondissement in the department of Calvados, 142 miles in a direct line west of Paris, or 168 miles by the road through Evreux, Lisieux, and Caen; in 48° 51′ N. lat. and 55′ W. long. The town stands in a very pleasant situation on the right bank of the river Vire, near its source. It is a handsome town; the principal public buildings are the courts of law, the town-hall, and the new prison. The population, in 1831, was 7500 for the town, or 8043 for the whole commune; in 1836 it was 7339 for the commune. The townsmen manufacture woollen cloth, both fine and for army clothing, woollen stuffs, dyed woollen yarn, coarse lace, paper, horn and wooden wares, needles, &c. There are tan-yards, dye-houses, and fulling-mills. There are four fairs in the year. There are a subordinate court of justice, a tribunal of commerce, some fiscal government offices, a high school for the commune, and a public library. There are iron-works in the neighbourhood.

The arrondissement comprehends 97 communes, and is divided into six cantons or districts, each under a justice of the peace: the population, in 1831, was 90,395.

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* See ante, p. 353.

(Malte-Brun, *Géographie; Dictionnaire Géographique Universel.*)

VI'REO. [VIREONI'NÆ.]

VIREONI'NÆ. [MUSCICAPIDÆ, vol. xvi., p. 11.] Mr. G. R. Gray makes the *Vireoninæ* the sixth and last subfamily of the *Muscicapidæ;* and in his arrangement it is immediately preceded by the extensive subfamily of *Muscicapinæ*. The *Vireoninæ*, according to Mr. Gray, consist of the genera *Vireo*, Vieill., and *Vireosylva*, Bonap. only.

VIRGI'LIA, a small chiefly tropical genus of the large na-ural family of Leguminosæ, named by Lamarck in compliment to the great poet and author of the 'Georgics.' The genus is distinguished by having its calyx 5-cleft. Papilionaceous flowers with the petals about equal in length. Vexil-um flat. Stamens 10, unconnected. Legume continuous, compressed, oblong, 2-valved, many seeded. Cotyledons flat, leafy. Radicle bent upon the edge of their lobes. Several species are natives of the Cape of Good Hope; V. aurea, of Abyssinia; and V. lutea, of North America. V. aurea is frequently mentioned as being a native of India, but it is more probable that it has been long introduced and acclimated, as no well-authenticated specimens have been found in a wild state. The roots are said to aste like liquorice, and the roots yield a yellow dye. V. utea is often cultivated in gardens, being an elegant and hardy shrub, of which the bark, like that of V. aurea, yields a yellow colouring-matter.

VIRGI'LIUS, or VERGILIUS, PUBLIUS MARO, was born at Andes, a small place near Mantua, on the 15th of October, B.C. 70, in the first consulship of Cn. Pompeius Magnus and M. Licinius Crassus. He was five years older than Horace, who was born B.C. 65, and seven years older than the emperor Augustus. His father, who probably possessed a landed estate, had his son instructed in he neighbouring towns of Cremona and Mediolanum Milan). According to Donatus, he stayed at Cremona ill he assumed the toga virilis on the day on which he entered on his sixteenth year, in the second consulship of Cn. Pompeius Magnus and M. Licinius Crassus: this day, according to the same authority, was the day on which the poet Lucretius died. Virgil was taught Greek by the grammarian Parthenius, and philosophy by the Epicurean Syron. It is apparent from the writings of Virgil that he had a learned education, and traces of Epicurean opinions are obvious in his poetry. When a division of lands in Italy was made among the veteran soldiers of Octavianus, Virgil lost his patrimony at Mantua (B.C. 41), but it was afterwards restored to him by Octavianus, through the in-ercession of some powerful friends, among whom are mentioned Alfenus Varus, Asinius Pollio, and Maecenas. His first Eclogue is supposed to allude to the loss of his ands and his recovery of them. Virgil probably afterwards resided at Rome, and he was in favour with Maecenas, who wished to pass for a patron of letters, and with the emperor Augustus. He preceded Horace in acquiring the patronage of Maecenas; for Horace attributes his own introduction to Maecenas to Virgil and Virgil's friend Varius. Virgil also spent part of his time at Naples and Tarentum. In B.C. 19 he visited Greece, where he intended to spend several years, for the purpose of perfecting his epic poem, the 'Æneid.' It was on the occasion of this voyage that Horace addressed to him one of his lyric poems (*Carm.*, i. 3). At Athens Virgil met with Augustus, who was returning from the East, and he determined to accompany Augustus back to Rome: but he fell sick at Megara, which city he visited probably on his road to Rome, and his illness was increased by the voyage to Italy. He lived however to reach Brundisium, where he died in the autumn of the year B.C. 19. According to his wish his body was taken to Naples, and interred on the Via Puteolana, at the second milestone from Naples. He is said to have written his own epitaph a short time before his death in the two following lines, which were placed on his tomb:—

> 'Mantua me genuit; Calabri rapuere; tenet nunc
> Parthenope: cecini pascua, rura, duces.'
>
> 'My birth-place Mantua; in Calabria death
> O'ertook me: and in Naples now I lie.
> I've sung of shepherds, fields, and heroes' deeds.'

The place of his burial is still pointed out by tradition, though the so-called tomb of Virgil at Posilipo has no pretensions to be considered as the monument of the Roman poet. He left as heredes the emperor Augustus and his friend Maecenas, the poet Lucius Varius and Plotius Tucca. In person Virgil is said to have had a clownish appearance, and to have been very shy and diffident, and of feeble health. He was intimately acquainted with all the distinguished persons of his age, and his friend Horace has commemorated his virtues and gentle disposition.

The principal poetical works of Virgil are his 'Bucolics,' 'Georgics,' and his 'Æneid,' an epic poem. The 'Bucolica' are probably his earliest works: they consist of ten short poems, which have also received the name of Eclogae, or Selections, a title which probably belongs to a later period than the age of the poet. The composition of these poems is assigned to the period between B.C. 41 and B.C. 37. The several poems were probably not written in the order in which they generally appear in the MSS. and the editions; but critics are not agreed on the exact chronological order, nor indeed can it be ascertained. These poems are not strictly Bucolic in the sense in which the poems of Theocritus are called Bucolic. It has been justly observed that they are rather allegorical poems with a Bucolic colouring. So far as regards the versification these poems have some merit, and Virgil has the credit of attempting to introduce among the Romans a species of poetry with which they were unacquainted. But this is all his merit: his Bucolics are defective in construction, ill connected in the parts, they have no distinct object, and are consequently obscure. The obscurity is owing both to the subject and the manner of treating it. The circumstances of Italy and of Virgil's time did not present the same materials for Bucolic poetry which Theocritus had treated with so much graphic power. Virgil, having undertaken to imitate his Greek model, was obliged to keep to the form, though he could not impress his copy with the same character. Accordingly we have shepherds who sing in alternate verses, like those of Theocritus, and a Corydon, who complains of unrequited love; but we do not find the truth which pervades the pure Bucolics of Theocritus. Virgil must have felt the insipidity and unmeaningness of poems which affected to be descriptive, and yet had no realities to correspond to them. To introduce some variety he treats of subjects of present interest; and his own fortunes and the sufferings of his countrymen are supposed to be depicted in his first and ninth Eclogues. But Virgil had a delicate subject to handle: it was necessary to be cautious in speaking of recent events, and he has consequently so constructed these poems, especially the first Eclogue, as to throw over it a mist of obscurity which the commentators have never been able fully to disperse. The first Eclogue is full of incongruities which render the interpretation most perplexing. All the other Eclogues also abound in allusions to the circumstances and persons of his own time; but many of the allusions are as obscure as the oracular responses of the Pythia. His Pollio, the fourth Eclogue, has not a single line which appropriately belongs to a Bucolic poem, nor indeed does the poet, as appears from the introductory verses, consider it as Bucolic in anything except the name. It is a perpetual enigma for the critics, and its solution still requires an Œdipus.

Virgil has borrowed numerous lines from the Greek poets, especially from Theocritus, but we can hardly allow him the merit of judicious adaptation. His Bucolics, even when he attempts to approach nearest to the true character of Bucolic poetry, give no real picture of rustic manners. The reader never imagines that his shepherds are really singing, like those of Theocritus; and all poetic illusion is completely destroyed by the want of due attention to the proprieties of place and person, both of which, as already hinted at, were impracticable in the circumstances under which he wrote. Julius Cæsar Scaliger, after a comparison between Virgil and Theocritus, prefers the Roman poet; and a few scholars, who are inferior to Scaliger in learning, have put themselves on the same level with him in critical judgment.

The 'Georgica' of Virgil are a didactic poem, in four books, addressed to his patron Maecenas. In the first book he treats of the cultivation of the soil, in the second of the management of fruit-trees, in the third of cattle, and in the fourth of bees. His judgment and poetic taste were riper when he wrote the 'Georgics' than when he was employed on his Bucolics; and if he began the 'Georgics' as early as his Eclogues, it is clear that he must have revised and improved them at a later date. An argument from which we might conclude that the first book was written before B.C. 35, is mentioned by Clinton (*Fasti*); but the two facts on which this conclusion depends can hardly be relied on. If the concluding lines of the fourth book of the 'Georgics' are genuine, Virgil was finishing his poem at Naples about the year B.C. 30. Originality is no part of Virgil's merit, and the materials of this poem are all borrowed; but in the handling of them he has shown skill and taste. He has turned an unpromising subject into a pleasing and even an instructive poem, for the truth of many of his rules and precepts is confirmed by other writers, both Roman and modern. He has relieved the weariness inherent in didactic poetry by judicious ornament and occasional digression without ever wandering far from his subject. It has been said that the poem would have ended better with the third book, which properly closes the poem; and that the fourth, which treats of the management of bees, hardly belongs to the subject. There is some truth in this remark: and the fourth book has the appearance of being an after-thought, and not a part of the original design, though in the opening of the first book, as we now have it, the management of bees is announced as one of the subjects. The treatment of bees indeed seems hardly important enough for one book in four, and the poet has given it a proportional length by closing it with the story of Aristaeus. If Virgil has erred in the choice of a poetic subject, he has at least redeemed his fault by the mode in which he has treated it, and his reputation must mainly rest on the 'Georgics.' He improved the structure of the hexameter verse as we find it in Lucretius; and though he never attains the vigour of this writer, whom he had carefully studied, he has avoided that abruptness and harshness which often characterise the lines of Lucretius, and remind us of the antiquated verses of Ennius.

The Æneis of Virgil is the great national epic of the Romans. It is said that Virgil in his will gave instructions that the Æneid should be burnt, either because it was imperfect, or for some other reason which is not known; but that on Tucca and Varius urging to him that Augustus would not permit this, he bequeathed the work to them on the condition that they should add nothing, and leave the imperfect verses as they were. The Æneid was published by Tucca and Varius after Virgil's death, and was universally admired. The poem consists of twelve books, which contain the story of the wanderings of Æneas after the fall of Troy, and his final settlement in Latium after the defeat of Turnus and the Rutuli. The Homeric poems are the model of the Æneid; the merit of invention is entirely wanting. The first six books are an imitation of the 'Odyssey;' the last six books are founded on the 'Iliad.' Though the adventures of Æneas are the direct subject of the Æneid, the glories of Rome and the fortune of the Julian House, to which Augustus belonged, are skilfully interwoven in the texture of the poem. The foundation of Alba Longa and the transfer of the seat of empire from that city to Rome, are announced in the first book of the Æneid, by Jupiter, to be the will of the Fates; and the great family of the Cæsars is declared to be the descendant of Æneas. The adventures of the Trojan hero at the court of Dido, queen of Carthage, give occasion to hint at the future rivalry between the Romans and the Carthaginians, and the long contest which was destined to end in the triumph of the descendants of the Trojan hero. The numerous allusions to actual circumstances and to the history of the republic were adapted to create or to confirm a popular notion of the Trojan descent of the Romans. Though the Æneid contains many fine passages, its poetical merits are greatly below those of the 'Iliad' and 'Odyssey.' The poem wants the unity of purpose and integrity of construction which so eminently characterize the 'Iliad,' and it is deficient in that truth and simplicity which form the never-tiring charm of both the 'Iliad' and the 'Odyssey.' The Trojan heroes of the Æneid are insipid personages; and the chief actor Æneas fails to excite our sympathy as much as his rival Turnus or the fierce Mezentius. But Virgil had other models besides Homer. The poets of the Alexandrine school were his study, and particularly Apollonius of Rhodes, whom he has often imitated. It must be admitted that Virgil's subject was barren, and it required considerable skill to invest it with poetic interest. He accomplished this indirectly by giving to it an historical colouring and connecting the fortunes of Rome and of his great patron Augustus with the illustrious names of Troy. He scattered over his work an abundance of antiquarian lore, in which he was well skilled; and the great extent of his learning and his skilful adaptation of it to his purpose are conspicuous all through the work. Virgil was pre-eminently a learned poet; and if he had not originality and strong feeling, he had at least good taste. His poem can bear no comparison with the 'Iliad' as a complete work. It does not abide in the memory as an entire thing; yet numerous single passages are remembered with pleasure—a clear proof that its merits are to be estimated rather by an examination of the details than by the general effect, and consequently that it fails in satisfying the highest conditions of art, which require such a unity of parts as shall render them all subordinate to one general conception. The Æneid contains many obscure passages; and though Virgil is generally used for early instruction in schools, he is in fact one of the most difficult Roman writers.

The influence of Virgil on the literature of Rome might be the subject of a copious essay. His works were a textbook for the Roman youth and a model for the poets. Those who followed him as epic poets were certainly greatly inferior to him. There are indeed many fine passages in Lucan and Silius Italicus, but a love of rhetorical ornament always infected the literature of Rome, and in the later ages of the empire all good taste was sacrificed to it. Virgil was also the great classical poet of the middle ages. From the time of Charlemagne to the present day we may trace him in innumerable imitators and admirers.

Several short poems attributed to Virgil are printed in the collected editions of his works. 1, 'Culex, or the Gnat,' a kind of Bucolic poem, in 412 hexameters, which has little merit, and is probably founded on a genuine poem of the same name by Virgil. 2, 'Ciris, or the mythus of Nisus and Scylla.' This poem has been attributed to Cornelius Gallus and others. 3, 'Copa,' a short poem in elegiac verse, containing an invitation by a woman who is attached to a tavern, to persons to come in and make merry there. Critics have assigned the authorship of this little poem to various persons. 4, 'Moretum,' in 123 verses, is probably a fragment of a larger poem which described the daily labour of a cultivator of the soil. The poem contains the description of the labours of the first part of the day only. The authorship of this poem is also uncertain. 5, 'Catalecta,' a collection of fourteen smaller poems.

The first edition of Virgil, which was printed about 1469, in small folio, has the following title: 'P. Virgilii Maronis Opera et Catalecta, Romæ, Conr. Sueynheym et Arn. Pannartz,' with a dedication by Giovanni Andrea, bishop of Aleria in Corsica, to Pope Paul II. The text was printed from bad MSS. This edition is very rare: it was reprinted in 1471. Virgil was printed by Aldus at Venice, in 1501, 8vo.; this edition also is very scarce. Virgil was often printed with the commentaries of Servius and others at the close of the fifteenth and the beginning of the sixteenth centuries. The edition of Robert Stephens, Paris, 1532, fol., contains the commentary of Servius. The edition of J. L. de la Cerda, which is valuable for the commentary, appeared at Madrid, in 3 vols. fol.: the several volumes were published in the years 1608, 1612, and 1617. The edition of Dan. Heinsius appeared at Leiden in 1636, 12mo.; that of Nicholas Heinsius, which is much better, was first published at Amsterdam in 1676. The edition of C. G. Heyne, on which great labour was bestowed, was published from the year 1767 to 1775, at Leipzig, in 4 vols. 8vo., with a very copious index: this edition was reprinted in 1788 with improvements. The fourth edition of Heyne, by G. P. E. Wagner, has the following title: 'Publius Virgilius Maro, Varietate Lectionis et perpetua Adnotatione illustratus à Christ. Gottl. Heyne. Editio Quarta, curavit G. Phil. Eberard Wagner, Lipsiae, 1830,' &c., 4 vols. 8vo. The text has been corrected after the best MSS., the Medicean, Vatican, and others; the punctuation has been improved, and the orthography amended. The text may be had separately, in a single volume entitled 'Publii Vergilii Maronis Carmina ad pristinam Orthographiam quoad ejus fieri potuit revocata, edidit Philippus

Wagner,' Leipzig, 1831, 8vo. This volume also contains the 'Orthographia Vergiliana.'

The editions of the several parts of Virgil are very numerous. A tolerably complete list of all the editions and translations is given by Schweigger, 'Handbuch der Classischen Bibliographie,' vol. ii., pp. 1145-1258. There s a good German translation of the Bucolics by J. H. Voss with valuable notes: the second edition is by Abraham Voss, Altona, 1830. J. H. Voss also translated the Georgics: both the translation and the commentary of Voss are highly esteemed. Martyn's prose English translations of he Bucolics, London, 1749, and of the Georgics, 1741, are alued for the commentaries. A complete translation of Virgil by J. H. Voss appeared at Brunswick, in 3 vols. vo., 1799, and has gone through several editions. The Eneid was translated into Scottish verse by Gawin Douglas, bishop of Dunkeld, and published at London in 553. The English versions of Virgil are numerous. ohn Ogilby's translation into verse appeared at London in 649 and 1650. The verse translation of Dryden was published by Tonson, London, 1697, with 'a hundred sculptures.' There is a translation in blank verse by Dr. Joseph Trapp, with notes: it is a very dull version. The Æneid translated by C. Pitt, and the Eclogues and Georgics by oseph Warton, with observations by Spence and others, was published by Dodsley, 4 vols. 8vo., London, 1753.

The materials for the life of Virgil are chiefly derived om the Life attributed to Tiberius Claudius Donatus, which, in its present form, is an uncritical performance, ut has the appearance of being founded on good materials. It is printed in Wagner's Virgil with notes, and in ome other editions also. The works already referred to, with Baehr's *Geschichte der Römischen Literatur*, contain bundant references to the editions, translations, and commentaries on Virgil's poems.

VIRGI'LIUS, or VERGILIUS, POLYDO'RUS, was a native of Urbino in Italy. He first made himself known by a small collection of Adagia, or proverbs, which he published in 1498, and which was several times reprinted n the course of the next half-century. Bayle quotes an dition of it in his possession printed at Basle, in 8vo., in 541, which professed to be according to the author's fourth evision. There is a great deal about this book of proverbs n the Letters of Erasmus, who, according to the notion f Virgilius, had behaved unfairly in omitting all mention of it in his own subsequent work of the same kind. Erasmus, very characteristically, when the booksellers wanted to suppress a preface of Polydore's to a new edition of his book in which he laid his complaint before the public, would not hear of such a thing; and the two uthors continued excellent friends, as they had been efore. Polydore at last of his own accord withdrew the bnoxious preface; and we find him in after years one of he various persons by whom Erasmus was supplied with money to buy a horse—an article which the great scholar was constantly in want of. Virgilius also suppressed, at he request of Erasmus, a reiteration of his complaint, which he had put into a dedicatory epistle prefixed to his next work, entitled 'De Rerum Inventoribus,' first published in three books, in 1499, and again at Strasbourg in 1509. Being in holy orders, he was before 1503 sent over o England by Pope Alexander VI. to collect the tax called Peter-pence; and he spent the greater part of the remainder of his life in this country, continuing his residence long after he lost his office, of which he was the last holder. In 1517 he republished at London his work 'De Rerum Inventoribus,' extended to eight books. A fourth edition of it was brought out at Basle, in 12mo., in 1536, and another in 8vo. in 1554; and there is a 12mo. edition of it, printed at Amsterdam by Ludov. Elzevir so late as 1671, along with another work by Virgilius, three books of dialogues entitled 'De Prodigiis,' against divination, which he appears to have finished at London in 1526, although the first edition mentioned by Gesner is one printed at Basle in 1531. Bayle had another printed at Basle, in 8vo., in 1545, and containing also two books 'De Patientia,' one 'De Vita Perfecta,' and one 'De Mendaciis,' all by this author. Erasmus in one of his Letters also speaks of a translation of the 'Monachus' of St. Chrysostom, which Virgilius had printed at Paris in 1528, and dedicated to him.

Soon after he came to England, Virgilius obtained the rectory of Church Langton in Leicestershire; and in 1507 he was made archdeacon of Wells, and was also collated in the same year, first to the prebend of Nonnington in the cathedral of Hereford, and then to that of Scamelsby in the cathedral of Lincoln, which last he exchanged, in 1513, for that of Oxgate in St. Paul's. In 1525 he published at London, in 8vo., but from a very imperfect and corrupt copy, the first edition of the fragment of Gildas, entitled 'De Calamitate, Excidio, et Conquestu Britanniæ.' He dedicated it to Bishop Tonstall; and, according to Nicolson, the same bad text was reprinted in 8vo. at Basle in 1541, in 12mo. at London in 1568, and in the 5th volume of the Paris 'Bibliotheca Patrum' of 1610, folio. Virgilius finished his principal work, his 'Historia Anglica,' a history of England from the earliest times to the end of the reign of Henry VII., in twenty-six books, in 1533: the dedication to Henry VIII. is dated in August of that year, and the first edition appears to have been published at Basle, in folio, in 1534. It was reprinted at Basle in the same form in 1536, 1556, 1570, and 1583; and in octavo at Leyden, under the care of Antonius Thysius, in 1549, and again in 1557. For clearness of narrative and neatness of style Polydore Virgil is perhaps the first of our Latin historians, and there are also a good many things in his work which are not to be found elsewhere; but he does not stand high as an authority. It is alleged that he destroyed numerous original documents which he had made use of in preparing his work, or, according to another version of the story, sent them off to Rome. His ignorance of the language and customs of the country has also no doubt betrayed him into some mistakes. He is charged however with having been principally misled by his prejudices in favour of the old religion, although he was hardly accounted a good Roman Catholic in all points. Various passages in his work 'De Rerum Inventoribus' are condemned in the 'Indices Librorum Prohibitorum et Expurgatorum;' and John Bale states that he approved of the marriage of ecclesiastics, and was opposed to the worship of images. Nor was he deprived of his preferments either by Henry VIII. or even by Edward VI.

He left England in 1550. Burnet, in his 'History of the Reformation,' Part ii., says under that date, 'This year Polydore Virgil, who had been now almost forty [fifty ?] years in England, growing old, desired leave to go nearer the sun, which was granted; and, in consideration of the public service he was thought to have done the nation by his History, he was permitted to hold his archdeaconry of Wells and his prebend of Nonnington, notwithstanding his absence out of the kingdom.' He is understood to have returned to Urbino, and is commonly stated to have died there in 1555. An opinion expressed by M. de la Monnoye, in a note upon Baillet's 'Jugemens des Savans,' ii. 160, that he must have died before 1540, appears to be refuted by the above statement from Burnet, who quotes as his authority the 'Rot. Pat.' 4 Ed. VI., 2 part.

VIRGIN'S BOWER. [Clematis.]

VIRGIN ISLANDS are an extensive group of small islands, which form part of the Columbian Archipelago commonly called the West Indies. They lie between 18° 5′ and 18° 50′ N. lat., and between 64° 10′ and 65° 40′ W. long., exclusive of the island of Santa Cruz, or Saint Croix, which properly does not belong to the group, but is commonly considered as forming part of it, because it belongs to Denmark, which also is in possession of some islands of the group itself. This island is about 50 miles south of the centre of the Virgin Islands.

The Virgin Islands extend in nearly a straight line from west-south-west to east-north-east, and occupy a space of about 100 miles in length, with an average width of 20 miles. The most western, Culebra, and Bieque, or Crab Island, are separated from the island of Puerto Rico by a narrow strait, beset with rocks and shoals. This group consists of about 100 islands, islets, and rocks, of which probably not more than 25 are inhabited and cultivated. The most eastern islands belong to the British; those in the centre to Denmark; and the most western are considered as an appendage of the Spanish island of Puerto Rico, but the British and Danes have the right of cutting wood on Crab Island, which is uninhabited.

The British islands lie between 64° 10′ and 64° 50′ W. long., and amount to about 50 in number; but most of them are very small, and only a few of moderate extent. They are stated to cover a surface not exceeding 60,000 acres, or between 93 and 94 square miles, which is less than half the extent of Rutlandshire, the smallest of the English counties. The largest of these islands are, Anegada, Virgin Gorda, Comance, Beef Island, Guana, Tortola, Jost van Dyke's, and Peter's Island.

Anegada, which is the most north-eastern island of the whole group, is the largest; it contains 31,200 acres, but has only a few inhabitants. [ANEGADA.]

Virgin Gorda, also called Spanish Town, which is considered to be a corruption of Penniston, the original name of the island, consists of a rocky mass, and two peninsulas which project from the mountains to the east and south-west. The rocky mass in the centre occupies a space about two miles in every direction. Its summit is about 1500 feet high. On the north the high rocks extend to the water's edge, but on the south they are separated from the sea by a low narrow tract. The eastern peninsula is about three miles long, but less than a mile wide, rocky, and of moderate elevation. The other peninsula, which is connected with the south-western extremity of the mountains, is low, and nearly four miles long. At its southern extremity are some low rocks, in which copper-ore is found; but it is not stated if these mines are worked at present. The island is said to contain 9500 acres. The soil is sandy and dry. The exports consist of sugar, rum, tobacco, indigo, peas, and some cotton. There are three places near the shores of the island which have good anchorage, and protect vessels against the swell of the sea; but they are rarely visited by foreign vessels, the produce of the island being sent to Tortola for exportation. At St. Thomas Bay, on the southern peninsula, is a cluster of houses, called The Town. The population of the island is not stated, but probably does not exceed 2500 individuals, of whom two-thirds may be negroes. In the prolongation of the southern peninsula is a cluster of rocks, exhibiting a great variety of fantastic figures, resembling ruined temples, columns, and arches. They are called the Fallen City or Broken Jerusalem.

Between Virgin Gorda and Tortola, at a short distance from the last-mentioned island, are—Great Comance, which is about two miles from south to north, with an average width of half a mile, very rocky and elevated, and thinly inhabited; and Beef Island, which is about a mile and a half from east to west, and more than half a mile wide. It is also rocky, but much lower than Great Comance, and mostly used as pasture-ground. Each of these islands contains an area of about 1500 acres. The island of Guana lies north of the most eastern point of Tortola, and is about two miles long, but on an average less than half a mile wide. It contains 1120 acres, and the soil is moderately fertile.

Tortola, the most important of the British Virgin Islands, extends nearly 12 miles from east-north-east to west-south-west, but its width never exceeds two miles. Its area is said to be 13,300 acres. It is a mountain-mass, broken up and furrowed by glens and ravines in every direction, so as to present a succession of undulating surfaces and precipitous eminences from one extremity to the other, without any considerable portion of level land. The most elevated part runs through the middle of the island from east to west, but does not attain any very considerable height. Sage Hill, the highest summit, which lies west of Road Town, attains only 1650 feet above the level of the sea. The descent is more precipitous to the north than to the south, and high rocky masses advance to the water's edge on the north-west, but at all other places the country on the shores of the sea is of moderate elevation. The shores are indented with bays, harbours, and creeks, which, together with the adjacent small rocks, afford shelter and anchorage for a great extent of shipping. The soil is dry, and has little depth; it is considered as having been nearly exhausted by repeated crops. The capital of the island is Road Town or Kingstown. It is built on the southern side of the island, in the western bight of a deep bay, which is five miles long, and three miles and a half wide, and constitutes an excellent harbour, being perfectly land-locked on all sides. The town consists of only one long irregular street, which encloses in a curve the base of a projecting point of land, and lies close to the water's edge. The houses are rather well-built, and consist mostly of two stories. As the whole export and import trade of the Virgin Islands belonging to Great Britain concentrates in this place, we insert the following table of the exports of the produce of the islands in 1837:—

Description of Goods.	Quantities.	Value in £.
Cotton-wool	4,950 lbs.	150
Fruits		229
Molasses	32,400 gall.	1,335
Salt (from Anegada) . .	1,180 bush.	31
Rum	9,240 gall.	665
Succades		23
Sugar	1,539,328 lbs.	21,000
Wood		8
Miscellaneous articles		869
		£24,310

The imports consisted of a few articles of British manufacture, but chiefly of various kinds of grain, as wheat, Indian corn, oats, and wheat-flour, and Indian-corn meal, which article amounted to 4468*l*. The next article of importance was timber and wood, as staves, shingles, boards and planks, hoops, masts, and spars, which had a value of 3377*l*. Wine was imported to the amount of 759*l*., spirits to 114*l*., and rice to 157*l*.: all other such articles to an inconsiderable amount.

In 1837 the harbour was entered by 266 vessels, of which only 2 were from Great Britain, 16 from the British colonies, 4 from the United States of North America, and the remainder (244) from other foreign countries. The last-mentioned vessels contained 1943 tons, whilst the British had only 496 tons, those of the British colonies 804 tons, and the North American vessels 635 tons. The number of vessels which departed from Road Town was 156, of which 5 were British, 12 belonged to the British colonies, 1 to the United States, and 138 to foreign countries. The import trade gave occupation to 837, and the export trade to 533 men. We do not find the population of the town stated, but that of the island amounts to somewhat more than 7000 individuals, of whom only about 300 are whites, and the remainder mulattoes and negroes. In 1837 there were three schools on the island, which were attended by 198 children.

To the north-east of the western extremity of Tortola is Jost van Dyke's Island, which is more than three miles long and about a mile wide. It is of moderate height, but terminates in high rocks on the north. Otherwise it resembles Tortola in soil and productions. It is stated to contain 3200 acres, which however seems to be too much.

To the south of Tortola, about four miles from the island, extends a row of islands from Broken Jerusalem on the east-north-east to the western extremity of St. John. They are all rocky and elevated, but small, none of them containing 1000 acres, with the exception of St. Peter's, which is stated to have an area of 1890 acres. The arm of the sea which is situated between this row of islands and Tortola is called Sir Francis Drake's Channel, and is of difficult navigation on account of the numerous rocks and shoals, the strong tides, and the heavy swell of the sea.

The Danish Virgin Islands lie between 64° 40′ and 65° 10′ W. long., and consist of St. John, St. Thomas, Santa Cruz, and a considerable number of islets. St. John is separated from Tortola by a strait, which is nearly six miles long, but never more than a mile wide. The island is about eight miles long, and on an average three miles wide, which gives a surface of about 24 square miles, so that it is nearly equal to Tortola in extent. The surface is very uneven, a circumstance which here, as in Tortola, prevents cultivation extending over the steeper declivities of the mountains, which in elevation are at least equal to those of the last-mentioned island. Only towards the shores of the sea there are some more level tracts, on which sugar, cotton, and some coffee are grown. In the interior there are many tracts where maize and ground provisions are cultivated, so that the importation of grain is comparatively small. The soil is very stony, but appears to be better than that of Tortola and St. Thomas. There are several good anchorages about the island, but the best is Coral Bay, which lies towards the south-eastern side, and is six miles long and above three wide: it is safe, being surrounded by high hills which shelter vessels against the winds. In 1828 there were on this island 150 whites, [illegible] free coloured-people, and 2200 slaves, and the plantations produced 12,000 cwt. of sugar, 33,000 gallons of rum, 11,000 gallons of molasses, 3500 lbs. of cotton, and a small quantity of fine coffee. At the western extremity is the small town of St. John, which has a pretty good harbour.

St. Thomas, west of St. John, is about 12 miles long from east to west, with an average width of 2½ miles, which gives a surface of about 30 square miles. It resembles Tortola in the unevenness of its surface, which renders a considerable portion of it unfit for agriculture. The mountains however rise higher, but their elevation has not been ascertained. The most elevated are west of the harbour of St. Thomas. The soil consists mostly of a very dry loam, and is of indifferent fertility. It is stated that ts productive powers have been diminished by repeated crops. Most of the white inhabitants of this island and of St. John are of Dutch origin, and Dutch is the common anguage. The population amounted, in 1828, according o an estimate, to 7000 individuals, namely, 5000 slaves, 1500 free coloured-people, and 500 whites. The plantaions yielded in the same year 20,000 cwt. of sugar, 54,000 gallons of rum, 18,000 gallons of molasses, and some cotton. But as large tracts are unfit for the production of colonial articles, maize, ground provisions, and fruits are cultivated to a considerable extent.

The town of St. Thomas is built on the north shore of a ine bay, which is about 3 miles long and 2 wide, and has good anchorage for 200 vessels. It derives its importance rom being a free port, open to all nations, and consequently a great entrepôt for articles of plantation con-umption, such as timber, corn, and flour, which are brought to it in large quantities from the United States. The town is built on three conical hills of nearly equal levation, on which stand some well-constructed fortresses, ommanding the harbour and shipping. The houses are built of stone or brick, several stories in height, and tiled n the Dutch manner. The population is stated to exceed 000 individuals, of whom 400 are whites.

Santa Cruz, or St. Croix, is the most important of the Danish possessions in the Columbian Archipelago. How-ver it does not belong to the group of the Virgin Islands, eing separated from the island of St. John by an open ea nearly 50 miles wide. It lies between 17° 40′ and 17° 0′ N. lat., and between 64° 30′ and 65° W. long. Santa Cruz is 24 miles long, and nearly 8 miles broad in the widest part. Its surface is about 110 square miles, so that t is larger than all the British Virgin Islands. No part f the surface is mountainous, but along the northern hores there is a chain of hills, the eastern extremity of which spreads over the whole width of the island. The arger portion of the surface is slightly undulating, and overed with a mould of considerable depth, which imparts o the island a great degree of fertility, which however frequently diminished by want of rain. The whole land is divided into 346 plantations, each containing 150 cres, of which number 155 are planted with the cane, and e others produce cotton and provisions. The whole well cultivated, and resembles a garden. Three good oads run through the whole length of the island from ast to west, one in the middle and the two others along he shores. The average produce of the sugar-plantations 20,000 casks of sugar and 10,000 casks of rum. In 1828 were exported 278,000 cwt. of sugar, 750,000 gallons of rum, 50,000 gallons of molasses, and 800 cwt. of cotton. The opulation was, in 1828, estimated at 32,000 individuals; amely, 2500 whites, 2500 free coloured-people, and 27,000 laves. The greater number of the whites are of English rigin, and English is the most common language.

Christianstadt, also called the Basin, is the capital of the island of Santa Cruz: it stands on the northern shore, n a small bay which constitutes its harbour: the ntrance is shut up by a formidable reef of rocks, through which there are only two narrow channels, which cannot be passed without the assistance of a pilot. The town is one of the best built in the West Indies. It is on the gentle declivity of a hill, so that the streets, which are parallel to the sea, rise like terraces one above the other. The streets are wide and straight, and intersect each other at right angles. The houses are chiefly of stone, and many of them in the principal streets exhibit a considerable degree of elegance. They have piazzas in front. Christianstadt is the seat of the governor of all the Danish possessions in the West Indies, and the government-house looks like a palace. Several other public buildings have a respectable appearance. The population amounts to 5000 individuals. There are four churches, Danish, Dutch, English, and Roman Catholic; and there are also two elementary schools for poor boys and girls. At the western extremity of the island is Frederickstadt, which has a population of 1500 individuals, and a good roadstead for shipping within a small circular bay: it carries on some commerce with the United States of North America.

The Spanish Virgin Islands are at a short distance from the eastern coast of Puerto Rico, and consist of two islands of moderate extent, and of several islets. The northern island is called Culebra (Snake Island), or Passage Island. It is about 8 miles long, and on an average little more than a mile wide. The surface is about 10 square miles. It is rocky, and rises to a moderate elevation. Some sugar and coffee are cultivated by a scanty population of about 300 individuals. The southern island is Bieque, or Crab Island. It extends from east to west about 16 miles, and is between 3 and 4 miles wide. The most eastern part, comprehending about two-thirds of the surface, is low, level, and overgrown with trees and bushes. On the northern side is a great lagoon, which however dries up at the end of the dry season. The western part of the island is rocky and hilly, and in general from 600 to 800 feet above the sea-level. There is no harbour, but there are several roadsteads which have good anchorage. The island was till lately uninhabited, and for a long time the British, Spaniards, and Danes had the right of cutting wood and fishing on the island. Before the French revolution, when the sugar-plantations yielded immense profits, the English and the Danes had some idea of acquiring the exclusive property of this island, and of forming settlements; but the subsequent changes in the political situation of most countries of America prevented the execution of these designs, and they were soon given up. Spain however, which, since the loss of its continental possessions, has begun to appreciate the value of its insular possessions in America, especially that of Puerto Rico, perceiving the injurious consequences to the commerce and safety of this island, if Bieque should be in the hands of another maritime power, has lately tried to induce England and Denmark to renounce their right, and to permit the island to be settled by a Spanish colony. We are not acquainted with the issue of these negotiations, nor do we know if the island has been settled or not.

Climate.—These islands have two rainy and two dry seasons. The short rainy season begins in May, and lasts from 15 to 20 days. The heat in this season is equal to that of the summer in Southern Europe. The months of June and July are dry, and the heat increases considerably during this time; the thermometer at noon generally ranges between 86° and 90°, but in August it is still greater, and at noon the thermometer usually marks 92°. At the same time the sky becomes covered with menacing clouds, which announce the approach of the autumnal rains, which commence in September like a deluge. The rain comes down like an immense quantity of water poured through a sieve, and in half an hour the whole surface of the islands becomes a sheet of water. This rainy season and the month preceding it are the period of the year when the hurricanes occur, between July and October. During the rains the weather becomes cooler, and when they terminate in October the thermometer stands about 10° lower than in August. In November the north-east and north winds set in, which in the beginning are accompanied by showers of rain and gales, but after some time they abate, and the weather clears up, and the summer or dry season sets in, which usually takes place in December. In this and the following months, up to April, showers are very rare, and the heat moderate, the thermometer ranging between 72° and 80°. This is the most healthy and most agreeable season of the year.

The Virgin Islands are subject to earthquakes, but the shocks are slight, and not attended with such dreadful consequences as in the Antilles, which are farther to the south-east. The northern shores of these islands are subject to a very heavy swell of the sea, called 'the ground-sea,' which rises, rages, and subsides while the air is calm, while there has been no indication whatever of a previous gale, and even while light breezes have for a considerable period preceding come from the south of east. The waves approach in gentle undulations, but suddenly swell against the shore, and break with great impetuosity. The period when the ground-sea sets in is generally October, and it continues, though with some interruptions, till April and May; but it rises also occasionally during June, July, and

August. By this swell the lower parts of the islands along their northern coast have been worn away, so that they terminate with high rocks or cliffs, except at those places where a reef lies before them, which breaks the force of the ground-sea.

Productions.—Besides the staple articles mentioned before, several plants are cultivated which yield occasionally articles of exportation, as ginger, turmeric, tobacco, pimento, and indigo. The grains of Europe are not grown, but maize and guinea-corn (*Holcus saccharatum*) are cultivated. The roots grown under the name of ground-provisions are sweet potatoes, yams, cassava or maniocca, and ground-nuts. In the kitchen-gardens are cultivated tomatos, capsicum, asparagus, pumpkins, water-melons, cucumbers, and several kinds of peas and beans. Two kinds of arum, sagittæfolium and hastatum, are extensively grown, and used as salad. Guinea-grass is grown as fodder.

There are large plantations of plantains and bananas. The cocoa-nut tree and the mountain-cabbage tree also grow. There are cultivated the orange-tree, the bergamot-orange (*Citrus bergamia*), the lime, the shaddock (or forbidden fruit), the sweet lemon, and the citron; the sour sop (*A. muricata*), the sweet sop (*A. squamosa*), and the custard-apple (*A. reticulata*). Two kinds of *Passiflora* are cultivated, namely, the granadilla (*P. quadrangularis*) and the water-lemon (*P. laurifolia*). Other fruit-trees are the pine-apple, the sapote (*Sapota mammosa*), aguacates (*Laurus persea*), the cashew-tree, the prickly pear, the guava, and the papaya or papau-tree. The castor-oil plant and the tamarind grow wild, but are also cultivated. Other wild-growing and useful plants are the aloe perfoliata and the agave Americana. In the forests are many useful trees, among which are mahogany and fustic trees.

A few domestic animals are kept, but most of them are imported from the Spanish Main. There are no wild quadrupeds, and birds are rare; but there are some kinds of lizards, among which is the iguana. There are two or three kinds of turtles. Fish is pretty plentiful, and many poor families live on it. Scorpions and scolopendras are frequent, but no mention is made of snakes.

Salt is obtained from several lagoons, which dry up in summer. In Virgin Gorda copper-ore is found.

History.—Santa Cruz and the Virgin Islands were discovered by Columbus on his second voyage, 1494. They were then inhabited, and Santa Cruz was the most northern island in which the Caribbees had established themselves. But towards the end of the sixteenth century no inhabitants were found on them. In the seventeenth century these islands became the resort of buccaneers; some Dutch buccaneers began to settle Tortola in 1648, but were expelled from the island by the English in 1666, and since that time the island has always been in their possession. St. Thomas was settled by the Danes in 1672, and some years afterwards St. John was also taken possession of by them. The first settlers of Santa Cruz were the Dutch, who arrived there in 1643, but were expelled by the English in 1646. Some years afterwards the English were driven out by the Spaniards, who again were expelled by the French, who began to cultivate the island, but with so little success that they abandoned it in 1695, preserving however their rights to it. In 1733 they sold it to the Danes for 75,000*l.* The good order established there by the Danish government and the fertility of the island attracted English planters and English capital, and in a few years the island was flourishing, and remained so notwithstanding the hurricanes, of which that of 1772 was very destructive, and a drought of four years' continuance, ending in 1791. The Danish islands were taken by the British in 1801, but restored in the following year. They surrendered again to the English in 1807, and remained in their possession until 1815, when they were again restored to the Danes. The British islands are under the authority of the governor of St. Kitt's, but they have a separate legislative assembly, which meets at Road Town. The Danish islands are governed by the Danish governor residing at Christianstadt, and the Spanish islands are appendages of Puerto Rico.

(West, *Beyträge zur Beschreibung von St. Croix*; *West India Sketch-Book*; and Waller, *Voyage to the West Indies*.)

VIRGINAL, a musical instrument now entirely disused. It is described by Dr. Burney as 'a keyed instrument of one string, jack, and quill to each note, like a spinet, but in shape resembling the present small piano-forte. It,' he adds, 'has been imagined to have been invented in England during the reign of Elizabeth, and to have been thus denominated in honour of that virgin princess; but a drawing and description of it appeared in Luscinius's "Musurgia" before she was born.' (*Hist. of Music*, iii. 5.) The compass of the virginal was from the second added line below the base to the second added line above the treble—or four octaves.

VIRGI'NIA, a Roman maiden, daughter of L. Virginius, whose name is famous in the early history of Rome. Her story is one of the most beautiful in Roman history. She possessed extraordinary beauty, and had been virtuously brought up by her parents. She was betrothed to L. Icilius, a tribune of the people. Appius Claudius, one of the decemvirs, attempted to seduce her; but finding that her virtue was stronger than his temptations, he had recourse to fraud and violence. Her father Virginius was absent at Mount Algidus, where he commanded a division of the army against the Æqui. The decemvir thought this a favourable opportunity, and instigated M. Claudius, one of his clients, to claim the girl as his slave. Accordingly one day when, accompanied by her nurse, she was going to the forum, where schools were then kept in the tabernæ, the client of Appius Claudius seized her, asserting that she was the daughter of one of his slaves, and consequently was his property. The nurse raised loud cries and called on the people for help. A crowd came together, and the girl was rescued; but the claimant declared that he would establish his right before a court of justice. The case was accordingly brought before the tribunal of Appius Claudius himself, where the client stated that Virginia was the daughter of one of his slaves, and had been carried into the house of Virginius, as he would prove by the evidence of Virginius himself; and he added, that until the return of Virginius she should be kept in the house of her lawful master. Great opposition was made by the friends of the girl to this claim, but Appius Claudius affected to think the demand of his client just. Icilius now stepped forward and claimed the girl as his betrothed wife: and when threats were unavailing, he implored Claudius to think of the consequences. Icilius was immediately surrounded by the lictors of the decemvir, and declared a disturber of the peace; but in order to have at least the appearance of justice on his side, Appius Claudius adjourned the case till the next day, adding that he would then inforce the law whether Virginius returned or not. Two messengers were speedily sent to Virginius to inform him of the danger of his daughter. Appius Claudius also sent a secret message to request his colleagues in the camp to refuse Virginius leave of absence; but the message came too late, for Virginius had already left the camp. On the morning of the following day, when all the city was in anxious expectation, Virginius, accompanied by some matrons and numerous friends, led his daughter to the forum, entreating the protection of his fellow-citizens. Appius ascended the tribunal, and, without listening to Virginius or Icilius, declared the girl to be the slave of his client, M. Claudius. When Claudius pressed through the crowd to seize Virginia, he was at first prevented by the multitude; but the threats of the decemvir overawed them, and his lictors made way for the client. Virginius, seeing the impossibility of saving his child, asked permission to have some conversation with her before their separation. This being granted, he took Virginia aside to a butcher's stall, and snatching up a knife, plunged it into her breast, saying, 'This is the only way in which I can deliver thee,' adding a curse on the head of Appius Claudius. The decemvir immediately ordered Virginius to be seized, but sword in hand he fought his way to the gate of the city. The friends of the unfortunate girl in the city roused the people to shake off the yoke of their haughty oppressors. Virginius in the camp appealed to the soldiers, and the power of the decemvirs was abolished.

(Livy, iii. 44-48; Dionysius Hal., xi., p. 700, 718, 719, ed. Sylburg; compare DECEMVIRS; APPIUS CLAUDIUS.)

VIRGINIA, one of the North American states, is situated between 36° 30′ and 40° 40′ N. lat., and 75° 15′ and 83° 30′ W. long. Its greatest extent from north to south is along 80° 30′ W. long., where it is nearly 200 miles: from east to west the greatest dimension is along 36° 35′ N. lat., where it measures about 400 miles. The area, according the latest estimate, is 65,624 square miles, or larger than at of England, Wales included, by about 7000 square iles. It is the largest of the states of the Union.

Boundary.—The southern part of the peninsula which parates Chesapeake Bay from the Atlantic belongs to rginia, and it is surrounded by the sea, except on the rth, where it borders on Maryland. The main body of e State borders, on the north, on Maryland, from which is separated by the Potomac to its source, a distance of ore than 350 miles measured along the bends of the er. From the source of the river the boundary between aryland and Virginia runs due north for 36 miles, when strikes the southern boundary-line of Pennsylvania. om the point where the three states meet, the boundary- ie between Pennsylvania and Virginia runs due west ong 39° 43′ N. lat. for 57 miles, when it turns due north d runs along 80° 30′ E. long., until it strikes the Ohio, ine of 64 miles in length. On the west of Virginia are io and Kentucky. It is divided from Ohio by the urse of the Ohio river for 355 miles, following the bends the river. Virginia is separated from Kentucky partly the Big Sandy River, which constitutes the boundary- ie for about 80 miles measured along the course of the er, and partly by the summit of the Cumberland Moun- ns, along which the boundary runs about 100 miles. nessee and North Carolina lie along the southern boun- ry of Virginia. The boundary between Virginia and nessee runs along 36° 35′ and is 90 miles long; that iich separates Virginia from North Carolina is a straight ie, which begins on the west in 36° 32′ 30″, and termi- tes on the shores of the Atlantic in 36° 30′. The tlantic Ocean and the Chesapeake Bay wash the eastern de of Virginia for about 110 miles.

Sea-coast.—A series of low sandy islands skirts the shores North Carolina. From Cape Hatteras it extends north- ard, separating Pamlico, Albemarle, and Currituck unds from the ocean. The north extremity of the Cur- tuck Sound is included within the boundary of Virginia. ie narrow strip of land which divides it from the sea is ndy and low, and the coast north of it as far as Cape enry is of the same description. It constitutes an un- oken line, which affords no shelter for vessels, and can ly be approached in small boats. It extends about 30 iles. Cape Henry rises to about 15 feet, and is a small sand- ll. It is about 12 miles from Cape Charles, and between ese two capes is the entrance of Chesapeake Bay. HESAPEAKE BAY, vol. vii., p. 41.] From Cape Henry Windmill Point, a distance of about 45 miles, the coast Virginia presents a succession of projecting headlands, closing many bays, some of which extend far inland, d preserve a considerable width and depth to a distance 20 to 50 miles from the sea. These larger bays are the tuaries of rivers, and admit large vessels, so as to consti- te good harbours. The smaller bays are formed by in- ntations of the shores, and most of them have safe ichorage for coasting vessels. The headlands between ie bays have low and frequently swampy shores, but at me distance from them the country rises from 15 to 20 et. Between Windmill Point, which lies on the north of ie æstuary of the Rappahannoc river and Smith Point, uth of the æstuary of the Potomac, which two points are early 20 miles distant from one another, a low and narrow each is backed by a higher ground of moderate elevation, nd in this part there are only a few short inlets, which fford shelter to boats and small coasting vessels.

That part of Virginia which lies east of the Chesapeake Bay, and is called the ‘eastern shore of Virginia,’ is skirted n the side of the Atlantic by a number of low sandy islands, hich towards the north form one row, but towards Cape harles two or three parallel rows. They are inhabited by few fishermen, and the straits which separate these lands from one another afford some passages for small oasting vessels. The shores opposite these islands have nly a few short inlets, but two or three of them afford helter and good anchorage for vessels which draw five or ix feet of water. The coast on the side of Chesapeake Bay has many indentations, most of which are from two to hree miles long, and constitute good harbours for small essels.

Surface, Soil, Climate, Agricultural Productions.—Nearly one-half of the surface of Virginia is mountainous. The Appalachian Mountains run through it obliquely from south-west to north-east, spreading along the southern boundary over the western, and towards the north over the central districts of the state. The south-eastern boundary-line of this mountain-region is marked by the Blue Ridge. This chain enters Virginia on the south at 80° 30′ W. long., and terminates on the banks of the Potomac east of Harper's Ferry, near 77° 40′ W. long. The north-western limit of the mountain-region is formed towards the south by the Cumberland Mountains and the boundary-line between Virginia and Kentucky; but east of the Big Sandy River it may be marked by a straight line drawn from the point where the river begins to separate Virginia from Kentucky, to the confluence of the two principal branches of the Monongahela in Pennsylvania. All the countries included between this line and the Blue Ridge constitute the mountain-region of Virginia. From the eastern base of this region a plain extends to the shores of the Atlantic and of Chesapeake Bay. This Atlantic slope presents itself under two different aspects. Along the shores of the sea it is a low undulating plain, and at the back of it a higher hilly country, which reaches to the Blue Ridge. These two plains constitute the maritime and the higher slope of the Atlantic. That portion of Virginia which is to the north-west of the mountain-region, between it and the rivers Ohio and Big Sandy, is much more hilly than the eastern plain, and may be called the hilly region of the Ohio and of the Kanawha. The following table exhibits a rough estimate of the respective areas of these four regions:—

	Square Miles.
1. Maritime or Lower Slope of the Atlantic .	8,500
2. Hilly or Upper Slope of the Atlantic . .	18,200
3. Mountain-region of the Appalachians . .	28,400
4. Hilly Region of the Ohio and Kanawha .	10,500
	65,600

1 *The Maritime Slope of the Atlantic* comprehends also the eastern shore of Virginia, or that part which lies east of Chesapeake Bay. This country consists of a tongue of land, about 10 miles in width, the islands included, but without them only 7 miles across. From north to south it extends 70 miles. Along the shores it is mostly covered with low sand-hills or swamps; but this sterile tract is hardly half a mile wide, and the interior is a level flat country, with a pretty good soil; for though the soil is thin, light, and always mixed with sand, it generally rests on a stiff clay, and the land is too level for the good soil to be carried off by rains. The principal crops are Indian-corn and oats, but there are also grown wheat, cotton, peas, beans, potatoes, and other vegetables. There are good orchards, in which the fig-trees and pomegranate-trees attain a large size, and yield abundant fruit. The palma-christi, from which the castor-oil is obtained, is cultivated to a considerable extent. The area of this tract is about 500 square miles.

The Maritime Region west of Chesapeake Bay has its western limit marked by the first waterfalls of the rivers traversing it from west to east, which occur where the general level of the country has a considerable rise. In the Potomac river the first falls occur at Georgetown above Washington, on the Occoquan river, at Occoquan, 7 miles from its mouth, and on the Rappahannoc above Fredericksburg. The western limit of the Maritime Region, between Georgetown and Fredericksburg, runs parallel to the great western bend of the Potomac, and about 7 miles from it. Further to the south the first falls occur on the Pamunkey, the principal branch of York River, between Woodsville and Hanover; in James River, at Richmond; in the Appomattox, an affluent of James River, 6 miles above Petersburg; and in the Roanoke, at Weldon, in North Carolina. Straight lines drawn between these points mark tolerably well the western limit of the Maritime Region.

The south-eastern portion of this region, or that which lies south of Hampton Roads, the lower and wider portion of the æstuary of James River, is a flat country which rises imperceptibly towards the south. The soil is a mixture of sand and clay, but less fertile than the eastern shore, and its productions are also the same. On some low tracts near the Dismal Swamp rice is cultivated, and this is the most northern point where that grain is cultivated on the Atlantic shore of the United States. The Dismal Swamp extends from north to south nearly 30 miles, and averages from east to west nearly 10: it is partly in

Virginia and partly in North Carolina. The soil of the swamp is a complete quagmire, trembling under the feet, and filling immediately the impression of every step with water. Towards the south is a large tract overgrown with reeds, without any trees, but intermixed with some evergreens. But the other parts are covered with cypress and cedar trees, and on the western border with pines. From these forests a large quantity of lumber is obtained. Near the centre of the swamp, in Virginia, is Lake Drummond, which extends about seven miles in every direction, and varies in depth from 10 to 20 feet. The surface covers about six square miles. In times of great drought this lake is the only feeder of the Dismal Swamp Canal, and when full its surface is 21½ feet above tide-water, and six feet above the summit-level of the canal, which is 22 miles long. The low country just noticed occupies an area of about 1550 square miles.

The remainder of the Maritime Region has not a level surface. Along the æstuaries level tracts of a moderate width are common, and they are generally swampy. But at a short distance from the rivers the country rises, and presents an undulating surface, which towards the western limits of the region is diversified with hills. The soil is alluvial, and the greater part of the substrata is composed of sand and pebbles; large masses of rock in their original position are rare, except at great depth. The substrata are covered with a mould, generally two or three inches deep, consisting of sand and vegetable matter. It constitutes by itself a poor soil, and as the surface is not level, the better part of the soil is subject to be washed away by the heavy rains. Some of the higher tracts are nearly destitute of vegetation and barren, and others are covered with forests of stunted pines, from which tar, pitch, and rosin are extracted. The bottoms of the rivers contain a much larger quantity of vegetable matter, and the soil is deeper. Their fertility is consequently much greater, and the crops are good. Cultivation does not extend far beyond these bottoms, except in some tracts between York River and James River. Wheat is not much cultivated, the soil being too light for it; but Indian-corn, oats, potatoes, and sweet potatoes are extensively grown; tobacco is also cultivated. The orchards yield apples, pears, cherries, quinces, nectarines, apricots, almonds, plums, pomegranates, figs, peaches, and mulberries. But there are very few tracts fit for the growth of grasses.

The climate of this low region, if compared with that of low countries on the east of the Atlantic, is distinguished by great and sudden changes. There is no season in which these changes do not occur, except October and November, which in the regularity of the weather approach the climate of Europe. The winters are much colder than in any part of Europe south of the Alps, and also more severe than in the low countries north of the Alps. Frosts are frequent, and sometimes very severe; the rivers and æstuaries are covered with ice, which is sometimes strong enough to be crossed by men and horses. But the frosts are generally of short duration, and followed by very mild weather. Snow falls very often, but the ground is seldom covered with snow for more than one or two days. In general the winter is distinguished by that fickleness which in Europe characterises the month of April. Until the middle of May the weather presents one incessant succession of rain and drought, frost and heat; sometimes it is excessively damp, cloudy, and hazy. About the latter part of May the air becomes dry and warm, the showers of rain are less abundant, and the weather is very pleasant during the month of June. In the two following months however the heat is very great, the thermometer rising almost every year to 90°, and sometimes to 96° and 98°. September has very heavy rains, but they are not frequent in October and November, when the weather is very mild. The approach of winter is gradual and uniform; there are indeed frequent light snows in November, but the more severe weather does not set in before the latter part of December. The following table, exhibiting the results of meteorological observations made at Richmond, during four years (1824-1827), will give a pretty complete idea of the temperature of this region, as that place, though near the Upper Slope of the Atlantic, is situated near the middle of the Lower Slope. For the sake of comparison we have added the temperature of London.

Mean Temperature of each Month of the Year, resulting from the Meteoric Observations made at Richmond.

	1824.	1825.	1826.	1827.	Mean.	London.
January . .	42°	34·6°	33·2°	25°	33·7°	36·34
February .	55	39	41	43·9	39·8	39·61
March . .	43	50	49·6	46	47·1	42·01
April . . .	53	55	57·8	59	54·7	47·61
May . . .	64·4	64·4	68	64·5	65·4	55·40
June . . .	75	73·6	73·3	73·6	73·8	59·35
July . . .	79	80	74·8	76·8	77·6	62·97
August . .	74·3	76·4	72·9	75	74·8	62·90
September .	66·8	65·7	68·9	67·2	67·1	57·70
October . .	57·3	60	56·8	56	57·5	50·19
November .	47·2	41·8	44	43·8	44·2	42·40
December .	40·8	33	34·2	44·6	38·1	38·71
Mean of the Year . .	56·5	56	55·7	56·5	56·2	50·5

Place.	Winter. Dec. to Feb.	Spring. March to May.	Summer. June to Aug.	Autumn. Sept. to Nov.
Richmond	37·2°	55·7°	75·4°	56·3°
London .	38·22	48·34	61·74	50·3

The winter in London is more temperate by one degree, while the summer is less hot by 13½ degrees. The difference in latitude between the two places amounts to 13° 58′.

Though the number of rainy days is less in this state than in England, the mean annual quantity of rain is much greater. According to Jefferson the annual quantity of rain at Williamsburg amounts to 47·04 inches, whilst at London it does not exceed 24·10 inches. Williamsburg is nearer the sea than Richmond. The mean annual temperature at Williamsburg is 57·21°.

The prevailing wind all the year round is the south-west; but in autumn and winter the wind blows frequently from the north-west, north, and north-east. Southern winds are rare, and those from the south-east are not frequent. The southern winds are attended by warmth, moisture, and hazy weather; those from the north and north-west bring cold and clear weather. The change of the wind produces sudden changes in the temperature. Jefferson states that the thermometer, on one occasion, descended 45 degrees in thirteen hours, from 92° to 47°, in consequence of a change of the wind.

2. *The Upper Slope of the Atlantic* extends from the western limit of the Maritime Slope to the Blue Ridge, which traverses Virginia for 260 miles, in a direction from south-west to north-east, and, except where it is crossed by the James River and Roanoke, is a continuous range. From the base of the ridge the country descends to the falls of the rivers in an inclined plain. Where the falls occur, a ledge of rocks extends across the state, rising from 100 to 200 feet above their base, which in most places is about 100 feet above the sea-level. From this ridge the rise of the country towards the mountains is continual but irregular. Its general level, where it joins the mountains, is from 500 to 600 feet above the sea: Lynchburg on the James River is 500 feet above it. The surface of the region presents only a comparatively small number of hills; it generally extends in undulating plains, which in many places have a gentle acclivity, but in others are broken and uneven, and between these plains are the deep depressions, in which the rivers run. The hills rise from 300 to 500 feet above their bases. Their slopes are generally not steep, but the soil is sometimes rocky, and not fit for cultivation. They are generally overgrown with trees, such as ash, beech, elm, hickory, chestnut, oak, and hemlock. The soil of the higher grounds between the bottoms of the rivers has in general a moderate degree of fertility, as gravel or sand is predominant, and only a few tracts of moderate extent have a large proportion of clay or loam mixed with the gravel. The cultivated tracts yield moderate crops of wheat, Indian corn, tobacco, and oats, and also rye and buckwheat. The orchards are extensive, and all the trees mentioned in the foregoing region succeed, except pomegranates and almonds. The forests, which still cover a considerable part of the surface, are comprised of oak, hickory, gum, maple, logwood, and especially yellow pine. The bottoms along the water-courses differ greatly in width, and are extensive along the large rivers: that of the James River is in general from two to three miles wide, and extends from Richmond

o Lynchburg 125 miles. These bottoms are from 100 to 00 feet below the general level of the adjacent high rounds, and the slopes which enclose them are ather steep and bold. The soil of the bottoms is enerally excellent, and produces good crops of wheat, ndian corn, and oats, and the best sort of tobacco, which extensively cultivated. Cotton is not cultivated to ny great extent, except in the bottoms of the Roanoke. early all the cotton exported from Virginia is from is district.

The hills which are dispersed over this region are olated, and do not range themselves in a certain direcon, except towards the south, where they are more freuent, and where they commonly lie in the direction of e watercourses from west to east. But there extends er the whole width of the state a series of hills and short nges, nearly in a parallel line with the Blue Ridge, and at a stance of from 15 to 30 miles east of it. This hilly tract mmences in North Carolina, enters Virginia some miles st of 80° W. long., is traversed by the Roanoke below onroe, and runs from this point to Lynchburg on the mes River. Lynchburg is built in the mountain-gap by hich the river passes the ridge. Thus far this ridge nsists only of isolated hills and short ranges, and bears general name. But north of James River, which for ore than 30 miles flows along its eastern base, it is called e South-West Mountain. It continues from the James iver in the same direction to the sources of the Pamuny and North Anna, is traversed by the upper branches the Rappahannoc above their confluence, and termites on the banks of the Potomac, about 12 miles below arper's Ferry. Towards the northern extremity it is lled the Bull Run and Kittoctan Mountains. This chain ses from 300 to 600 or 700 feet above its base, which is out 500 feet above the sea-level. The hills are covered ith forests, consisting of oak, hickory, green maple, hite and yellow poplar, black and white walnut, ash, ssafras, dogwood, chestnut, and chestnut-oak. The long lley which extends between these hills and the Blue ange is in general hilly; for several offsets of the Blue idge advance into it from 5 to 10 miles from the range, d it also contains many isolated hills. The soil is much ore fertile than to the east of this ridge. There are comratively very few places covered with a barren sand or avel. It generally consists of a good mould lying on a bstratum of red clay, which also constitutes the principal gredient of the upper soil. In the northern district it is hter, and contains a good proportion of sand or gravel. e principal objects of agriculture are Indian corn, wheat, e, oats, and potatoes. In the southern districts much bacco is grown, and hemp in several places. The orards yield apples, peaches, cherries, plums, quinces, and apes. The general level of this valley is from 500 to 0 feet above the sea, except towards the north, where is lower.

We have no exact meteorological observations made in is region. It is stated that the mean annual temperature from three to six degrees lower than in the maritime gion, otherwise there does not appear to be a great difrence between these two regions. It is only observed, at the climate, though equally hot in summer, is more althy, and that this region suffers less from droughts an the countries along the coast.

3. *The Mountain-region of the Appalachians* lies west of e upper region of the Atlantic Slope. Its eastern limit well marked on our maps by the Blue Ridge, but that is ot the case with the western boundary, probably because n that side several offsets of the mountains extend northest into the hilly region of the Ohio and Kanawha. It ay however be defined as running from the southern oundary of the state along the Cumberland Mountains nd the boundary-line to the Big Sandy River. From the anks of this river it extends in a direction east-northast across Great Cherry-Pond Mountain to Sewell Mount nd the Greenbrier Ridge. From the termination of Greenrier Mountains it extends north by east along Laurel ange, which skirts Tygart's Valley on the west until it is roken by Tygart's Valley River near Leedsville. Hence t continues in the same direction to Cheat River, which reaks through it near 39° 20′ N. lat. East of Cheat River he ridge continues in the same direction until it enters Pennsylvania, where it goes by the name of the Laurel Hills. The extensive region enclosed by this line and the Blue Ridge is widest in the southern part; for between the southern boundary of the state and 37° 25′ N. lat. it extends 150 miles east and west, but north of that parallel it hardly ever exceeds or falls much short of 90 miles.

The Appalachian Mountains, at least that portion of them which lies south of the Potomac River, are a mountain-system belonging to the limestone formation, and may, as to structure, be compared with the Jura Mountains in Switzerland and Germany. The Appalachians are like a huge embankment raised by nature to separate two inclined planes, which slope from its base in opposite directions; that on the east towards the south-east and the Atlantic, and that on the west towards the north-west and the Ohio. The upper level of this embankment, which is nearly 100 miles wide, does not appear to be less than 1000 feet above the sea-level, except at the northern extremity towards the Potomac, and at a few places where the rivers which collect the waters that originate in this region have excavated deep beds at the points where they escape from the mountain-system. A great portion of the upper level however rises to a much higher elevation. Many ridges, from 1000 to 2000 feet above the general level, traverse it longitudinally. In some parts eight or ten of such ridges are laid down on the maps; and, if we may judge from the course of the rivers, their number must be still greater. These ridges in general run parallel to one another, at least for a great distance, until they unite. But as these junctions do not take place between all the ridges in the same parallel of latitude, but frequently at considerable distances from one another, the transverse ridges which are formed by these junctions do not run in straight lines across the mountain-system, but in irregular lines. The elevation of these ridges above their common level varies. If we except the most northern tract, near the course of the Potomac, where the whole system is considerably depressed, we find that the smallest elevation which is known occurs at Rockfish Gap, a depression of the Blue Ridge, west of the university of Virginia (north of 38° N. lat.), which is traversed by a road leading from Charlottesville to Staunton. The highest level of this road is only 1260 feet above the sea-level, probably not more than 600 feet above the country lying east of it, and hardly more than 100 feet above the plain of Staunton, which extends west of it: Staunton itself is 1152 feet above the sea. The most elevated points are the peaks of Otter, which occur in the Blue Ridge near 37° 35′ N. lat., and whose highest summit is 4260 feet above the sea, and the White Top Mountains, situated near the place where the three states of Virginia, North Carolina, and Tenessee are contiguous, and whose highest summit is supposed to rise above the peaks of Otter. These however are single summits, which are not frequent in this mountain-system, as the upper edges of the ridges extend in nearly straight lines, which at certain distances, usually from eight to ten miles, are broken by narrow depressions, through which gaps the roads run by which the valleys below the mountains are connected. The general elevation of the ridges seems to vary between 2500 and 3000 feet, except towards the banks of the Potomac, where it sinks to between 1400 and 1000 feet above the sea. All these ridges however are narrow, their bases in general not occupying more than two or three miles in width, except where two ridges join and form a small monutain-knot. They must also be very narrow, if it be true, as it is stated, that these ridges fill up only one-third of the surface of the region, and that two-thirds are occupied by the intervening valleys.

In reviewing this extensive region we begin from the south: that portion of it which lies south of 37° N. lat. is drained by the upper branches of the Tenessee River. There are here four large parallel ridges, besides several smaller ones: they are called, from west to east, the Cumberland Mountains, Clinch Mountains, Iron Mountains, and the Blue Ridge. About five miles north of 37° the two first-named chains are connected by a transverse ridge, running west and east, called the Great Ass Mountains. By this ridge the sources of the Big Sandy River are separated from those of the Clinch, an upper branch of the Tenessee. The continuation of the transverse ridge runs from north to south near 81° 15′ W. long., between Clinch Mountains and Iron Mountains, and between the last-mentioned chain and Blue Ridge from north-east to south-west. The last-named transverse ridge separates the waters which flow into the Kanawha from those which form

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the showers of rain are less abu
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lowing months however the h
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mountain-region, or the
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and run parallel to it.
of limestone-land,
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the space between these

Blue Ridge widens considerably north of curs here, which extends to the banks of Its surface is uneven and in some parts lopes of the hills are not too steep for culti- soil is rather fertile, being what is called of the best description. Wheat, rye, maize, are extensively grown. The cultivation of arried on to some extent, and the orchards This tract is considered the most fertile ginia, and is very populous; the county of tains 64 persons to a square mile.

the Upper Potomac, or the country between Chain on the west and the Alleghany the east, may be considered as a terrace evated above the basin of the Shenandoah. the Potomac river opposite Cumberland is the sea-level. This number indicates the lowest part of the basin. We have no rise of the country as it proceeds south- think that Moorefield, which is built at the the two great forks of the south branch of can hardly be less than 1000 feet above the d the countries in which these two rivers ay attain an elevation of 2000 feet. The whole versed longitudinally by several ridges, which surface to such an extent as to leave only nar- s between them. The soil of the valleys is or of indifferent quality, much inferior to that ys in the basin of the Shenandoah, except a bottom ground on the south branch of the hich is said to have yielded for thirty successive crops of maize. As the climate is cold the always succeed, and therefore the inhabitants their attention more to the rearing and fatten- and keeping of other domestic animals, especi- But in the country which approaches the north the Potomac cultivation is more attended to. not succeed well. The other grains however, and hemp, are cultivated. Fruit-trees are scarce, ception of apples and cherries. The vegetables grown in this basin and that of the Shenan- are peas, French and horse beans, parsnips, ions, sweet and common potatoes, lettuce, and A great part of the low lands and the slopes ountains are still in their natural state, being th forests. On the top of the mountains and ated portions of the slopes are cedars, and pitch, d white pines; in some places these trees have their full growth, but in others they are stunted. elevated grounds are overgrown with oak, beech, ck walnut, and hickory; and on the low grounds the banks of the rivers, which are subject to be in- d during the freshets, the woods consist mostly of e-trees, plane-trees, and red or water maple.

portion of the mountain-region which lies west of leghany Mountains contains the basin of the Green- iver, an affluent of the Great Kanawha, and the upper of the Monongahela River. The valley of the Green- is nearly 80 miles long, extending between 38° 35′ and N. lat. Its lowest point, at the confluence of the rier River with the Kanawha, is 1333 feet above the vel; and from this point the country rises continually source of the river, where the country must be more 2000 feet above the sea. Its most elevated portion is n, even along the banks of the river, and affords only fferent pasture-ground for cattle and sheep; but lower the valley increases in width and the soil is more tful, and in this part cultivation is carried on to some tent. The principal articles which are cultivated are ize, oats, and buckwheat: cattle are rather numerous.

e upper basin of the Monongahela, lying between the Alleghany Mountains on the east and the Laurel Ridge the west, is evidently much elevated above the sea- vel; but we have no data to determine this point more precisely. The eastern portion is drained by five or six small rivers, which by their union form Cheat River, an upper branch of the Monongahela: it is an elevated table-land, whose surface is distinguished by extensive prairies, as considerable portions of it are quite free from timber and covered with grass. Numerous herds of cattle find pasture on these natural meadows. The western district, or that which lies contiguous to the Laurel Ridge, is a valley, called Tygart's Valley. It is about 30 miles long and two wide, possesses a fertile soil, and is well settled. It produces maize, wheat, rye, oats, and several vegetables in abundance: clover and timothy are extensively grown, and cattle are numerous. The mountains surrounding the valley are well stocked with fine timber—oak, poplar, cherry, pine, fir, red cedar, &c.

It is obvious that the climate must greatly vary in the mountain-region, which in some parts rises to 2500 feet above the sea, and in others hardly attains an elevation of 300 feet. We are however unable to form a more distinct idea of it for want of observations. We are only informed that the winters are more severe than in the countries east of the Blue Ridge, and that they generally last three months without interruption. The vegetation on the east side of the Blue Ridge is usually two weeks earlier than on the west side; but the air is never so hot on the west side as to dry up the grass during the summer months, which is the case in the countries east of the Blue Ridge. The mountain-region is however more subject to droughts than the Upper Slope of the Atlantic, though less so than the Maritime Region.

4. *The Hilly Region of the Ohio and Kanawha* comprehends the north-western portion of the state, or that which is enclosed by the north-west limit of the Mountain-Region, the Sandy River and the Ohio, and the boundary of Pennsylvania. This region is considerably elevated above the sea, as we may infer from the level of the Ohio, which runs along the lowest portion of it. The mouth of the Big Beaver River in Pennsylvania, only a few miles from the boundary-line of Virginia, is 694 feet, and that of the Great Kanawha 481 feet, above the sea. We have no data to determine its elevation at the base of the Mountain-Region, except the fact that the Kanawha, where it issues from it, is about 1300 feet above the sea; but the level of the rivers, if they were known, would give a very vague idea of the general level of the country, as that is several hundred feet higher than the river-beds.

The most southern portion of this region is the most elevated, and the surface is mountainous. It may be supposed to be divided from the hilly section, which is north of it, by a line commencing on the banks of the Big Sandy River, where that stream is cut by 38° N. lat., and running thence to a point on the Great Kanawha River a little above the salt-works, whence it continues in the same direction to the salt-works on the Little Kanawha, where it turns eastward, and joins the Laurel Ridge west of Beverly, in Tygart's Valley. The whole country south of this line consists of high masses of rocks, which generally rise to the elevation of mountain-ridges. These ridges are united to the western edge of the Mountain-Region at right angles, as they generally extend from south-east to north-west. They fill up all the spaces between the rivers, so that there are no bottoms along their courses, except a few small tracts hardly a quarter of a mile wide. The rocks, which are generally contiguous to the banks, rise to 500 feet and more, and in many places with a nearly perpendicular acclivity. Where the acclivity is not too steep the mountains are covered with soil, and along the watercourses overgrown with bushes; but in many parts the rocks are bare. At some distance from the watercourses the high grounds present a hilly surface, usually covered with low bushes or stunted trees. There are only a few tracts of moderate extent, on which maize, oats, and potatoes are grown; and the pastures which the higher grounds afford are too poor for cattle. The inhabitants obtain their livelihood partly by taking lumber to the lower country.

The remainder of this region is only hilly, with the exception of the north-eastern country, where some short ranges of mountains occur. The hills rise from 300 to 500 feet above the river bottoms, generally with a gentle acclivity, though in many places they are steep. The bottoms differ greatly in width. Along the smaller rivers they are only a quarter of a mile wide; whilst along the Kanawha and the Ohio they vary between one and two miles in width. In most parts they have a considerable degree of fertility, but the higher grounds differ greatly in this point. The least fertile part is that tract which lies between the Big Sandy River and the Great Kanawha, where the hills which form the higher grounds between the rivers consist of sandstone, rise with a steep acclivity, and have flat tops covered with low bushes. They are not cultivated, and not even available as pasture-ground for sheep. In the depressions between the hills the soil is also poor. The bottom of the Great Kanawha has many very fertile tracts, and in general it yields good crops of maize, wheat, rye, oats, and potatoes. The hills which enclose the bottoms of this river and those of its affluents contain large trees, especially lime, hickory, sugar-maple, laurel, hemlock, and sumach: the sumach attains here the height of a stately tree. North of the Great Kanawha the country grows better. It is still hilly, but the slopes of the hills are not so steep, and the soil rests on limestone, which gives it a greater degree of fertility; but as this part of the country has only been settled within the last fifty years, cultivation is almost entirely limited to the fine tracts on the river-bottoms. The higher grounds are overgrown with trees or bushes. The best portion of this region is the basin of the Monongahela. Though the river-bottoms are not so wide as those of the Ohio or Great Kanawha, they are very fertile, and produce abundant crops of wheat, maize, rye, oats, potatoes, and vegetables. In some places the higher grounds rise into mountains. The most extensive of these mountains is that called Chestnut Ridge, which runs nearly parallel to the Laurel Chain of the Mountain-Region, about 10 miles from it. This ridge and a few other mountains are steep, and unfit for cultivation; but in general the hills on the higher ground, though broken, have a good soil, which produces maize, rye, and oats. The higher grounds between the Laurel Chain and Chestnut Ridge are destitute of trees, but in summer they are covered with grass. They are better suited for grass than grain, though small quantities of wheat and maize are grown, and the crops of oats, rye, and buckwheat are good. The most northern part of Virginia, or that narrow tract which lies between the western boundary-line of Pennsylvania and the Ohio, resembles the countries on the banks of the Monongahela, being much broken, but equally fertile.

We have no information respecting the climate of this region. But as that portion of it which extends along the banks of the Ohio cannot materially differ in climate from that part of the state of Ohio which is similarly situated, we add here the result of the meteorological observations made at Marietta in Ohio, in 1840. Marietta is about 550 feet above the sea-level.

Meteorological Observations made in Marietta in 1840.

Months.	Thermometer.				Fair Days.	Cloudy Days.	Rain and Melted Snow.		Prevailing Winds.
	Mean Temp.	Maximum.	Minimum.	Range.			Inches.	100ths.	
January .	25·00	43	–4	47	11	20	2	33	W. N.W.
February .	41·00	74	–0	74	15	14	3	08	W. SW. S.E.
March. .	48·66	78	16	62	12	19	3	21	W. N. SE.
April . .	56·57	88	26	62	17	13	4	25	S.W. N. S.E.
May . .	61·80	91	33	58	21	10	5	21	S. S.E.
June . .	68·66	89	43	46	19	11	4	25	S. S.W.
July . .	71·25	92	51	41	23	8	2	17	S. S.W.
August .	72·43	90	51	39	22	9	5	25	S. S.W.
September	57·27	82	34	48	20	10	2	00	S. S.E. N.
October .	52.83	82	19	63	19	12	3	92	S.W. S. N.W.
November	40·60	68	22	46	14	16	1	92	W. S.W.
December	32·14	58	6	52	11	20	1	50	W. N.W.
Mean .	52·35				204	162	39	09	

In comparing the mean temperature with that of London [Vol. xiv., p. 110], it appears that on the banks of the Ohio, in 39° 25′ N. lat., the two first and the two last months of the year are colder than at London; but that the other months are warmer, and three months (June, July, and August) are nearly ten degrees warmer. The mean temperature of the whole year however is only a little more than two degrees above that of London. The annual quantity of rain is much greater, namely, 39 inches, that of London amounting only to 24·10. The monthly range of the thermometer is very great, especially about the equinoxes, where it amounts to more than 60 degrees.

Rivers.—Virginia has numerous navigable rivers. They all originate within the Mountain-Region or on the ranges which form the edges of that region. The greater number run east and south-east, and flow into the Atlantic. The others flow north or north-west into the Ohio.

The Potomac, from its source to its mouth, forms the boundary between Maryland and Virginia. The upper branches of this river drain the northern portion of the Mountain-Region. Its north branch, which is generally called simply the Potomac, rises in that part of the Alleghany Mountains which is locally named the Backbone Mountain, and it runs with many bends in a north-east and east direction to its union with the South Branch. At their confluence the last-mentioned river has the greater volume of water. It rises with two branches, called the North Fork of South Branch and the South Fork of South Branch, near 38° 30′ N. lat., and runs nearly 100 miles before it unites with the north branch. The united river passes through several ridges of the Mountain-Region with numerous bends, and shortly before it issues from the mountains it is joined from the south by the Shenandoah. This large river rises near 38° N. lat., and drains nearly the whole of the Mountain-Region north of that parallel between the Kittatinny Chain and the Blue Ridge. It flows 130 miles before it joins the Potomac. Immediately after the junction of the two rivers, the Potomac traverses the Blue Ridge by a narrow gap bounded by rocks and enters the Atlantic Slope, through which it flows in a south-east direction until it meets the tide-water at Georgetown. Below tide-water the Potomac loses the features of a river in that of a bay, which gradually widens as it approaches the Chesapeake Bay, and where it mingles its waters with the Chesapeake it is seven miles and a half wide. The Potomac may be navigated by the largest vessels as far as Alexandria, about 80 miles from its mouth, and by vessels drawing not more than 20 feet water to the Falls which are 13 miles above Alexandria. These falls are [illegible] miles in length, and have a considerable descent; above the falls the navigation for boats is much interrupted, but yet the river is navigated as far as Cumberland, above the junction of the North and South Branch. It does not appear that the South Branch is navigated, but the Shenandoah is navigated for six months of the year by small craft as far as Port Republic, a distance of about 100 miles.

The Rappahannoc rises on the eastern declivity of the Blue Ridge, with two branches called the Hedgeman and Rapid Ann, which unite after a course of about 50 miles. After the union of these streams the river becomes navigable, but 10 miles farther down it has some falls, and a short distance below them it meets the tide-water at Fredericksburg. In approaching the sea it widens to a narrow bay, which at its lower extremity is about two miles across. It may be navigated by vessels of considerable burden, as it has two fathoms water up to Fredericksburg. Its course is about 160 miles.

York River originates in the South-east Mountains with two branches, the Pamunkey and Mattapony. The Pamunkey runs about 120 miles before it meets the Mattapony, which runs about 100 miles above the place of confluence. By their union the York River is formed, which is an æstuary from one to three miles across. After a course of 39 miles it falls into Chesapeake Bay. The river is very important for navigation. It admits the largest ships to Yorktown, 12 miles from the sea, where it forms an excellent harbour. Up to the union of its two branches it has a depth of three fathoms, and admits coasting vessels. Though the Pamunkey has some small falls above Hanover, it may be navigated by boats to its junction with the North Ann River, 70 miles from its mouth; and the Mattapony is also navigable for boats nearly to the same extent.

The James River rises in that part of the Mountain Region which lies between the Alleghany Mountains and the Kittatinny Chain, with two branches, which commence near 38° 30′ N. lat., and run for nearly 30 miles southward and parallel to one another. They are called Jackson's River and Cow-Pasture River. Jackson's River, having traversed a narrow gap between two ridges, turns east and and is joined by the Cow-Pasture River about 10 miles fr ther down. The James River thus formed runs with great rapidity southward between high mountains, and turns again to the east above Pattonsburg, at which place it is 806 feet above the sea-level, and begins to be navigated. It passes through the Blue Ridge at the Balcony Falls, which impede the navigation, but are now avoided by a canal about six miles long which runs parallel to the river. At Lynchburg the level of the river is 500 feet above the sea. Below Lynchburg it turns to the north-east and runs with great rapidity, but is navigable. Above Scotsville it passes the South-east Mountains, and at that place its level is only 255 feet above highwater mark, and at Columbia, at the mouth of the Rivanna, only 178 feet. Lower down the current of the river is gentle until it approaches the falls above Richmond, where it descends 80 feet within six miles, and immediately below the falls it meets the tide-water. A canal connects the tide-water below and the navigable water above the falls. Below he falls the river gradually widens and assumes the features of a bay, and after a course of 90 miles farther it merges in Chesapeake Bay. The wide expanse of its mouth affords a harbour for vessels of any size, but it is not safe n winter; this wide expanse is called Hampton Roads. Large vessels may sail up to James Town, more than 20 miles above Hampton Roads; but farther up there are only 15 feet of water. Vessels of 250 tons sail up to Warwick, and of 125 tons to Rockets, a mile below Richmond. From he Rockets to Richmond there are only seven feet water. The whole length of this river, the Jackson River included, s 368 miles; but along the bends it is probably 500 miles. The largest of the affluents of the James River is the Appomattox, which rises at the base of the South-east Mountains, and runs about 150 miles. About 20 miles from its onfluence with the James it has some falls, up to which he tide-water comes. Near these falls is Petersburg, to which town vessels drawing seven feet water may sail; and he navigation is continued above the falls by the Upper Appomattox Canal. Two others of the affluents of James River are navigable. The Rivanna, which joins it from the orth, was always navigable for 22 miles from its mouth, r the place where it passes through the South-east Mountains; but the navigation has lately been extended o Piraeus, within one mile and a quarter of Charlottesville. he other navigable affluent is Willis River, which joins he James River from the south a few miles below the emouchure of the Rivanna. The Willis is a small river, and esembles rather a canal than a river; still it is said to be avigable for 25 miles from its mouth.

Nansemond River, which flows only 15 miles and falls nto Hampton Roads, is navigable for vessels of a hundred ns as far as Suffolk, 10 miles from its mouth.

The Nottoway and Meherrin rivers drain a large part of he country south of the James River, each of them runng about 100 miles, and uniting, after having entered orth Carolina, to form the Chowan River. Vessels of nsiderable burden may navigate the Chowan, and sail the Meherrin to Murfriesboro, in North Carolina. The o branches of the Chowan are navigable for boats in the eater part of their course, but not in summer.

The upper course of the Roanoke lies within Virginia. his river rises in the Mountain-Region, about 2000 feet ove the sea-level; but at Salem, about 15 miles from its urce, it is only 1006 feet above it, which shows that the st part of its course must be very rapid. After having ssed through the Blue Ridge and the South-east Mounins, it becomes navigable below Monroe, and runs eastuth-east with numerous bends until it enters North Calina, where the navigation is entirely interrupted by a gh cataract at Welden. Its largest affluent, the Dan, es on the eastern declivity of the Blue Ridge, and ains the most southern portion of the Atlantic Slope. It navigable for boats as far as Danville, near which town me falls occur.

The Ohio divides Virginia from the state of Ohio, having tween these two states a course of 355 miles. It is nagable all this distance for vessels of thirty or forty tons rden, though there is a rapid above the mouth of the reat Kanawha River, called Letart's Rapids, over which e river runs for about half a mile with great velocity; t it is only dangerous for persons who are not acquainted ith the navigation of the river. The vessels which genelly navigate the river cannot go up to Pittsburg in Pennlvania in summer, when the water is low, but only to Wheeling in Virginia; and this circumstance has lately much increased the population of Wheeling.

The Monongahela, one of the principal branches of the Ohio, is formed by three rivers, Cheat River, Tygart's Valley River, and West Fork. The two first-mentioned rivers originate within the Mountain Region in the Greenbrier Ridge and the Alleghany Mountains; and the West Fork in the hilly region west of the Laurel Mountains. The West Fork and the Tygart's Valley River unite in Virginia, but the Cheat River joins them in Pennsylvania. Cheat River, a considerable stream, which brings down a great volume of water, is very rapid and has several falls; it is only navigable as high as Jackson's Iron-works, a distance of eight or ten miles from the point where it joins the Monongahela. The Monongahela, or the river formed by the union of Tygart's Valley River and West Fork, affords an easy navigation as far as Morgantown, about 10 miles from the boundary of Pennsylvania, for steam-boats and flat boats; but above Morgantown the navigation can only be effected in times of freshets. The West Fork is also navigable for flat boats in times of freshets as far as Clarksburg; and the Tygart's Valley River, for about 10 miles from its confluence with the West Fork. By means of these rivers the produce of the country which is drained by them finds its way to Pittsburg in Pennsylvania, and eventually to the countries on the Mississippi.

The Little Kanawha, which joins the Ohio at Parkersburg, runs more than 100 miles, and does not appear to be navigable for any great distance; but its principal affluent, Hughes River, which joins it about 15 miles above its confluence with the Ohio, is large enough to float vessels of considerable burden. Great quantities of lumber are carried down this river.

The Great Kanawha has its most remote sources south of the boundary-line of Virginia, in the valley enclosed by the Blue Ridge and the Iron Mountains; it traverses the Mountain-Region by a course of 120 miles, running first north-east and afterwards north-west. In these parts it is called the New River, and its course is very rapid. Where it is joined by the great branch, the Greenbrier River, it is still 1333 feet above the sea-level. Soon afterwards it leaves the Mountain-Region, but its rapidity increases. As far down as the mouth of Gauley River the stream flows between high rocks with such force as to render its crossing very hazardous. From the place where the river is joined by Gauley River it bears the name of Kanawha. Two miles below that place are the Great Falls, a fine cataract of 22 feet over a natural dam of rocks which spreads irregularly across its bed. Below this place it becomes navigable, and at Charleston, or Kanawha, as the place is also called, it is 300 yards wide, 20 feet deep at low-water, and navigable for large steam-boats. No obstruction to navigation occurs to its confluence with the Ohio, a distance of 70 miles. Gauley River is only navigable for eight miles from its mouth; but Elk River, which joins the Kanawha at Charleston, is navigable to Union Mills, 10 miles above Suttonville in Nicholas county, a distance of more than 40 miles from its mouth. The Coal River, which joins the Kanawha 12 miles below Charleston, is navigable in the times of freshets to a great distance, but in ordinary seasons only to the Lower Falls, which are five miles from its mouth.

The Guyandotte, which runs about 100 miles, and the Big Sandy River, which flows about 120 miles, and for 70 miles forms the boundary-line between Virginia and Kentucky, are probably navigable for a great distance from their mouths, but we find nothing mentioned respecting this matter.

The most southern portion of the Mountain-Region is drained by several rivers, which by their junction, which takes place in the state of Tenessee, form the Tenessee River. These rivers are called, from east to west, Holston, Clinch, and Powell's. They are the only rivers that drain the Mountain-Region which are navigable in their natural state. That is at least the case with the three branches of Holston River and with Clinch River.

Productions.—The agricultural productions and most common forest-trees have been already noticed. Though the forests still occupy the largest part of Virginia, very little timber is exported. The timber is of excellent quality in the Mountain-Region, but it cannot be brought to any place where it can be shipped without raising the price beyond the market-price of timber. The Hilly Region of the Ohio has excellent timber-trees; and planks, boards, staves, &c. are exported from that region by way of the Ohio and the navigable rivers which drain it. In this region ginseng is gathered. There are several kinds of shrubs yielding berries, as gooseberries, and wild vines.

Wild animals are now rare on the east side of the mountains, but they are still common in the western districts. The most common are bears, wolves, deer, the racoon, squirrel, and opossum. The largest of the wild birds is the wild turkey, which is still in the western districts and in the Blue Ridge. There are also several kinds of water-fowl, among which are the canvas-back duck of the Potomac, and the sora, or American ortolan. Other remarkable birds are the turkey-buzzard, the mocking-bird, the red-bird, and the humming-bird. Partridges and quails, as they are called, are common. All the rivers abound in fish in the lower part of their course, and most of those that frequent the rivers of the Atlantic Slope are of the same kind which are found in Europe; but in the rivers which fall into the Ohio are several kinds of fish which are not found in Europe, as the black perch, the grennel, the blue cat, the buffalo, and the salmon-pike. There is also the soft-shell turtle, which surpasses in flavour the fine green-fat turtle. Oysters, lobsters, and other shell-fish are abundant on the coast. Bees are reared to a considerable extent.

Virginia is very rich in minerals. In the Upper Atlantic Slope, gold, iron, black-lead, copper, and limestone are found. Gold is found in a tract which commences near the Rappahannoc, south of Fredericksburg, and extends parallel to the Blue Ridge, crossing the James River at its junction with the Rivanna, and passing thence into North Carolina and Georgia. The quantity of gold collected in Virginia, and deposited at the Mint of the United States and its branches, between 1829 and 1840, amounted in value to 578,595 dollars. Coal is found in the neighbourhood of Richmond, especially between the James and Appomattox Rivers, and is worked at several places. Iron-ore is abundant along the base of the Blue Ridge. In the Mountain-Region iron-ore of very good quality occurs, but it is not worked to any considerable extent. Lead-mines are worked in the Iron Mountains, near Austinville, not far from the southern boundary of the state. This region abounds also in limestone, sandstone, slate, gypsum, and other useful minerals. The country west of the Alleghany Mountains is richer in minerals than the other parts of the state. Bituminous coal and iron-ore are abundant, and several coal-mines are worked to a considerable extent. Beds of limestone are extensively distributed, and the caverns, which are of frequent occurrence in the limestone rocks, furnish large quantities of nitre. The region west of the Blue Ridge contains several hot-springs and other medicinal springs, which are resorted to by invalids, and the inhabitants of the lower countries on the Atlantic, during the summer heats. Salt-springs are frequent, and almost every year new ones are discovered. Salt is made at several places. The salt-works on the banks of the Great Kanawha yield every year 1,200,000 bushels, and furnish with this article most of the countries west of the Appalachian Mountains.

Western Virginia is a very picturesque country, though the great quantity of forest often intercepts the view. The various caves, especially Weir's Cave, near Port Republic on the Shenandoah, are much visited. The Natural Bridge in Rockbridge county, near Fincastle, is a bridge of solid limestone rock, which arches over a deep ravine, at the bottom of which a small stream flows; from the surface of the water to the roadway over the bridge, the height is above 200 feet. The passage of the Potomac through the Blue Ridge at Harper's Ferry is one of the most striking phenomena of a mountain-range, which has apparently been interrupted by some violent convulsion.

(Jefferson's *Notes on the State of Virginia;* Imlay's *Topographical Description of the Western Territory of North America;* Parkinson's *Tour in America;* Cornelius, *Tour in Virginia, Tenessee,* &c.; Birkbeck's *Notes on America;* Wood's *Two Years' Residence in the Illinois Country;* James's *Account of Long's Expedition to the Rocky Mountains;* Martin's *Gazetteer of Virginia and the District of Columbia;* Darby's *View of the United States;* and the Boston *American Almanac for* 1842.)

Legislature and Government.—The constitution of Virginia, originally formed and adopted in 1776, was amended in 1830. The legislature consists of a Senate and a House of Delegates, which are together called the General Assembly of Virginia. The number of senators is 32, who are elected for four years, one-fourth being renewed every year: they must be freeholders, and not less than 30 years of age. The House of Delegates consists of 134 members, who are chosen annually by the people: they must be at least 25 years of age. All elections are by open voting, and not by ballot. Persons holding lucrative state offices and ministers of the gospel are ineligible both for the Senate and the House of Delegates. All laws must originate in the House of Delegates.

The governor is elected by the General Assembly for three years. His salary is 3333⅓ dollars. He is assisted by three counsellors, of whom the lieutenant-governor is one. The counsellors have a salary of 1000 dollars each.

Virginia returned to the last Congress (the 27th, which expired March 3, 1843) 21 representatives. To the present Congress (the 28th), according to an Act of Congress passed in 1842, it returns 15 representatives. Virginia, like all the other states, returns two senators to the Congress.

Courts of Law, &c.—The chief courts of Virginia are—a Court of Appeals, a General Court, Circuit Courts, and County Courts.

The Court of Appeals consists of a president, with a salary of 2750 dollars, and 4 judges, with a salary of 2500 dollars each. This court holds two sessions annually, one at Lewisburg and one at Richmond.

The General Court is held at Richmond. It has appellate jurisdiction in the last resort in criminal cases and also original jurisdiction of probates and administration. It is the duty of 15 of the judges who hold the Circuit Courts to attend the General Court, 11 being required to form a quorum.

For the Circuit Courts the state is divided into 10 judicial districts, and each district into two circuits, except the 4th, which comprises three. There are 21 judges, one for each circuit, each of whom has a salary of 1500 dollars, and four dollars for every 20 miles of necessary travelling. The chancery and common law jurisdictions are blended in the same judge in all the circuits except the 3rd of the 4th district, where there is a judge on the law side with a salary of 1800 dollars, and one on the chancery side with a salary of 2000 dollars; but on the death of either of the present two judges, his duties are to devolve on the other without any increase of salary.

A Circuit Superior Court of Law and Chancery is held twice every year in each county and corporation.

A County Court is held by four or more justices of the peace every month in each county. These justices are country gentlemen and plain farmers, whose services are gratuitous. Their jurisdiction is very wide. At the monthly and quarterly sessions of four or more justices deeds and wills may be proved, and both chancery and common law cases determined, with right of appeal to a superior court. They try exclusively slaves for all offences. Free negroes and Indians are on the same footing as slaves. They have also extensive authority in matters of county police. One justice can hold a court, with jurisdiction in all causes in which the value does not exceed twenty dollars.

Revenue, Debt, &c.—The revenue obtained by taxes in the year ending Sept. 30, 1841, was 615,904 dollars. The total amount of the resources of the state was estimated at 12,763,067 dollars, held by the commonwealth proper, the Board of Public Works, the N.W. Turnpike-Road Company, the Literary Fund, and the Sinking Fund. The total expenditure of the state in 1841 was 991,813 dollars. The aggregate debt is 6,994,307 dollars, the annual interest paid on which is 409,069 dollars, 1,365,300 being at 5 per cent. and 5,284,707 at 6 per cent.

In 1839 there were in Virginia 25 banks, of which 20 suspended specie payments entirely, and one in part, in October and November, 1839, there being only four which did not suspend.

The aggregate militia force of Virginia is 107,547 men.

Education, &c.—In 1809 the General Assembly passed an act by which all fines, escheats, and forfeitures of every description were appropriated to a permanent fund for the encouragement of learning generally, leaving the application of it to future legislatures. In 1816 the sum due to Virginia from the general government for military expenditure during the recent war with Great Britain was transferred to this fund, which, thus augmented, was found, in

817, to amount to more than 900,000 dollars, yielding an nnual income of upwards of 50,000 dollars, exclusive of ccasional accessions from fines and forfeitures. A permanent appropriation of 45,000 dollars a year was made or the education of the poor, and 15,000 dollars a year or the erection and support of a university. The permanent capital of the Literary Fund now amounts to 1,437,065 ollars. The revenue of 1841 was 84,313 dollars, which eft a surplus of 22,040 dollars to be applied, with the original appropriation of 45,000 dollars, to 1842. In 1822 he number of poor children instructed was 3298; in 826 the number was 9865; in 1830 the number was 4,169. In 1841 the number was 27,329, the total number f poor children being 48,193. The total expenditure for uition and other expenses was 72,225 dollars. The number of schools was 3253.

The University of Virginia was founded in 1819, in the eighbourhood of Charlottesville. The venerable presient Jefferson, then nearly eighty years of age, planned the uildings and superintended their erection. In 1824 they ere so far advanced that an agent was sent to England to ngage professors, preparatory to opening the university. ive professors were brought from England, to whom were dded two American professors, and the university was pened in April, 1825. In 1842 the University of Virginia ad 9 professors, 200 alumni, and 170 students. The nnual expense of instruction is 75 dollars, room-rent and ther college expenses 23 dollars, the total college charges mounting to 98 dollars; board for 44 weeks (washing included), 110 dollars; wood and lights, 20 dollars; total xpense to each student, 228 dollars. The library contains 6,000 volumes, among which are many valuable works.

In 1842, Wiliam and Mary College, at Williamsburg, ounded in 1693, had 4 instructors, 98 students, and a brary of 5000 volumes; it is under the Episcopalians. he total expense to each student is 205 dollars. Hampen-Sidney College, in Prince Edward County, founded in 783, had 5 instructors, 65 students, and a library of 8000 olumes. Washington College, near Lexington, founded n 1812, had 6 instructors, 126 alumni, 136 students, and a brary of 2700 volumes. The total expense to each stuent is only 144 dollars. Randolph-Macon, at Boydton, ounded in 1832, had 6 instructors and 98 students: it is nder the Methodists. Emory and Henry College, at lade Spring, founded in 1839, had 4 instructors, 143 tudents, and a library of 1000 volumes: it is also under he Methodists. Rector College, in Harrison County, ounded in 1839, had 50 students: it is under the Baptists.

In 1842 the Medical School attached to the University f Virginia had 3 professors and 45 students. The Medical epartment of Hampden-Sidney College, at Richmond, ounded in 1838, had 6 professors, 50 students, and 14 grauates. The Episcopal Theological School, in Fairfax ounty, founded in 1822, had 4 professors, 43 students, nd educated 126. They have a library of 4000 volumes. he Union Theological Seminary, in Prince Edward ounty, founded in 1824, had 3 professors, 20 students, nd educated 175: it is under the Presbyterians. The brary contains 4000 volumes. The Virginia Baptist eminary at Richmond, founded in 1832, had 3 professors, 7 students, and a library of 1000 volumes.

There are about 60 academies in Virginia, with from 30 o 40 students each, in which the Latin and Greek languages and the elements of mathematics are taught. There re probably about 200 grammar-schools, instituted and onducted solely by their respective teachers. But the argest part of the youth of both sexes receive their elementary instruction in domestic schools, which are very requently formed in this way:—a country gentleman ngages a teacher at a moderate salary, and receives the hildren of his relations and neighbours as scholars. Many f these schools are attended by children of both sexes, ut a great number of them are solely for females, who re instructed in polite literature, geography, &c., and frequently in French, music, and drawing.

In 1841 there were published in Virginia 4 daily newspapers, 35 weekly, 12 twice and thrice a week, and 5 periodicals.

Canals and Railroads.—In 1840 the canals of Virginia were—Alexandria Canal, from Georgetown to Alexandria, 7½ miles; James River and Kanawha Canal, from Richmond to Buchanan, 175 miles; Dismal Swamp Canal, from Deep Creek to Joyce's Creek, 23 miles; and 11 miles of branch canals: total 216½ miles.

In 1840 the railroads were—the Richmond, Fredericksburg, and Potomac, from Richmond to Aquia Creek, 75 miles; the Louisa Branch, 24 miles from Richmond to Gordonsville, 49 miles; the Richmond and Petersburg, from Richmond to Petersburg, 23 miles; the Petersburg and Roanoke, from Petersburg to Weldon, 59 miles; the Greensville, from near Hicksford to Gaston, in N. Carolina, 18 miles; the City Point, from Petersburg to City Point, 12 miles; the Chesterfield, from the coal-mines to Richmond, 13¼ miles; the Portsmouth and Roanoke, from Portsmouth to Weldon, in N. Carolina, 80 miles; the Winchester and Potomac, from Harper's Ferry to Winchester, 32 miles. Total, 361½ miles.

Population, &c.—In 1642 the population of Virginia was 20,000; in 1660, 30,000; in 1703, 60,606; in 1749, 85,000; in 1763, 170,000; in 1790, 747,610; in 1800, 880,200; in 1810, 974,622; in 1820, 1,065,366; in 1830, 1,211,375; in 1840, 1,239,797, consisting of 740,968 whites, 448,987 slaves, and 49,842 free coloured. The number of inhabitants to a square mile is 19¼, being the 14th in relative density to the other states. In 1671 there were 2000 slaves; in 1790, 293,427; in 1830, 469,757. In the ten years from 1830 to 1840 the number of slaves has been reduced by 20,770, the free coloured have been increased by 2494, and the whites have been increased by 46,668. In 1841 the tax on slaves produced 99,239 dollars, from which it appears that the annual tax on each slave is four-tenths of a dollar.

Of insane and idiots, in 1840, there were 1048 whites and 348 coloured; of blind, there were 426 whites and 466 coloured; of deaf and dumb, there were 453 whites and 150 coloured.

Of the religious classes in Virginia the Baptists are the most numerous; they have about 400 churches, 250 ministers, and 50,000 communicants. The Methodists have about 100 ministers and 40,000 communicants. The Presbyterians have 120 churches, 120 ministers, and about 10,000 communicants. The Episcopalians, who include the most wealthy part of the community, have 88 clergymen and 3722 communicants. Besides these, there are Roman Catholics, Quakers, Jews, &c., each with several congregations.

Imports and Exports.—The imports into Virginia from foreign countries, in the year ending September 30, 1841, were of the value of 377,237 dollars, the amount of 351,917 dollars being in American vessels and 25,320 in foreign vessels. The exports were of the value of 5,630,286 dollars, of which 5,628,910 dollars were domestic produce and 1376 foreign produce.

Statistics.—The following details of mineral, agricultural, and manufactured produce are abstracted from a series of tables given in the 'American Almanac' for 1843, which are founded on official data collected in taking the census of 1840.

Mineral Produce.—In the year ending June 1, 1840, Virginia produced 18,810 tons of cast-iron from 42 forges, and 5886 tons of bar-iron; 876,648 lbs. of lead; gold of the value of 51,758 dollars; 5600 bushels of anthracite coal; 10,622,345 bushels of bituminous coal, employing 995 men; 1,745,618 bushels of salt, employing 624 men; granite, marble, &c. of the value of 84,489 dollars.

Agricultural Produce.—In the year ending April 1, 1840, Virginia produced 10,109,716 bushels of wheat, 87,430 bushels of barley, 13,451,062 bushels of oats, 1,482,799 bushels of rye, 243,822 bushels of buckwheat, 34,577,591 bushels of Indian corn, 10,597 lbs. of hops, 65,020 lbs. of wax, 2,944,660 bushels of potatoes, 364,708 tons of hay, 25,594 tons of hemp and flax, 75,347,106 lbs. of tobacco, 2956 lbs. of rice, 3,494,483 lbs. of cotton, 3191 lbs. of silk cocoons, 1,541,833 lbs. of sugar, 403,590 cords of wood; dairy products of the value of 1,480,488 dollars; products of the orchard of the value of 705,765 dollars; market-garden produce of the value of 92,359 dollars; 13,911 gallons of wine; lumber of the value of 538,092 dollars; tar, &c. 5809 barrels; skins and furs of the value of 23,214 dollars. The number of horses and mules was 326,438; of cattle, 1,024,148; of sheep, 1,293,772, which yielded 2,538,374 lbs. of wool; of swine, 1,992,155; poultry of all kinds of the value of 754,698 dollars.

Manufactures.—In the year ending June 1, 1840, Virginia manufactured machinery of the value of 429,858 dollars, employing 445 men; hardware, cutlery, &c. of the value of 50,504 dollars, employing 150 men; 9330 small arms, employing 262 men; precious metals of the value of

41,000 dollars, employing 52 men. There were 47 fulling-mills, 41 woollen manufactories employing 222 persons, the goods manufactured being valued at 147,792 dollars. There were 22 cotton manufactories employing 1816 persons, the goods manufactured being valued at 446,063 dollars. The flax manufactures were valued at 4873 dollars, silk manufactures at 515 dollars, and mixed manufactures at 227,861 dollars. The manufactured tobacco was valued at 2,406,671 dollars, employing 3342 persons; hats and caps manufactured were valued at 155,778 dollars, and straw bonnets at 14,700 dollars. There were 660 tanneries, employing 1422 persons. Of manufactories of leather for saddles, &c. there were 982, and the manufactures were valued at 826,597 dollars; 126 persons made 1,200,308 lbs. of soap, 463,525 lbs. of tallow candles, and 837 lbs. of spermaceti and wax candles. Of distilleries there were 1454, which produced 865,725 gallons of spirits; of breweries there were 5, which produced 32,960 gallons; 1631 persons were employed in both. There were 10 powder-mills, but only 11 men were employed, who made 2850 lbs. of powder. There were 4 glass-houses and 2 for glass-cutting, employing together 164 men, and 33 potteries, employing 64 men; 12 paper manufactories, employing 181 men; 50 printing-offices and 13 bookbinding-shops, employing together 310 men; 9 rope-walks, employing 60 men; 1592 men were employed in making carriages of various kinds. There were 764 flour-mills, 2714 grist-mills, 1987 saw-mills, 61 oil-mills, employing altogether 3964 men; and 675 men were employed in manufacturing furniture. Of retail dry goods, grocery, &c. there were 2736 stores, with an invested capital of 16,684,413 dollars. There were 31 commercial houses in foreign trade and 64 commission houses, having together an invested capital of 4,299,500 dollars. The shipping built was valued at 136,807 dollars.

Virginia is divided into 112 counties.

Towns, &c.—*Richmond* is the seat of government. It is beautifully situated on the ascending slope of the north bank of James River, in 37° 32′ N. lat. and 77° 26′ W. long., 130 miles from the entrance of Chesapeake Bay, 116 miles from Norfolk, 74 miles from the former site of James Town, and 30 from City Point, which is the head of the navigation for large vessels, but vessels drawing 15 feet ascend to Warwick, 5 miles below Richmond, and vessels drawing 10 feet to Rockets, a little below Richmond. Opposite the city are the James River Falls (or more properly Rapids), which extend nearly six miles up the river, which within this distance descends more than 80 feet; but a canal passes round the Falls, and the river is navigable nearly 200 miles above them. On the opposite bank of the river is a small town called *Manchester*, which is connected with Richmond by a bridge, over which runs the railroad from Richmond to Petersburg. The ground on which the city is built, though generally sloping upward from the river, is broken into several hills of different heights. The plan of the city is regular, the principal streets running parallel to the river, which are called A Street, B Street, &c., and crossed at right angles by others, which are called First Street, Second Street, &c. The streets are nearly all wide, but badly paved, imperfectly drained, and never lighted. The chief public building is the State House, or Capitol, which is finely situated in the middle of a lawn, on the brow of a hill which overlooks the city. It is a copy of the Maison Carrée of Nîmes, the plan of which was sent over by Mr. Jefferson when he was ambassador in France. It contains a statue of General Washington by Houdon. The state penitentiary is on a rising ground to the west of the city; the prisoners work in company, but are not allowed to speak to each other. There is a poorhouse and a female orphan asylum. There are sixteen churches, three Methodist, three Episcopalian, three Baptist, two Presbyterian, and one each Roman Catholic, Unitarian, Quaker, Campbellite, and Jewish. The government of the city is conducted by a mayor, a recorder, eleven aldermen, and a council of fifteen. There are large beds of coal within a few miles of the city, and the Falls of the river afford water-power to any extent. There are several flour-mills and one or two cotton-mills. The commerce consists chiefly in the exportation of tobacco and flour. The population in 1830 was 16,060, of whom 7755 were whites, 6349 slaves, and 1965 free coloured. The population is probably now about 20,000. There are two daily papers, and one three times a week.

Abingdon, 309 miles south-west from Richmond, has a court-house and three churches. The inhabitants are about 2000, of whom only about 200 are blacks. A weekly newspaper is published. In the neighbourhood are some extensive salt-works.

Buchanan and *Pattonsburg*, two increasing villages on opposite sides of the James River, and 181 miles west from Richmond, have together about 600 inhabitants.

Charlottesville is a small town, 81 miles west-north-west from Richmond: it contains about 1000 inhabitants, 400 of whom are slaves and 100 free coloured. There is a court-house, four places of worship, Episcopalian, Baptist, Methodist, and Presbyterian; a female academy, and a preparatory school for boys destined for the university of Virginia, which is about a mile and a half distant from this town. The buildings of the University occupy an oblong quadrangle about 500 feet long by [illegible] wide. The principal building, called the Rotunda, is at one end of the quadrangle, of brick, circular, with a flattened dome, and a Corinthian portico. It is a copy of the Pantheon at Rome, and about one half of the diameter of the original building. In the neighbourhood of Charlottesville is Monticello, formerly Jefferson's residence, on the summit of a hill about 500 feet above the Rivanna. It commands a magnificent view of the Blue Ridge and the surrounding country. [CHARLOTTESVILLE.]

Fincastle, 176 miles west from Richmond, is a small town with about 800 inhabitants, of whom 200 are negroes. It has a court-house and four churches, and publishes a weekly newspaper.

Fredericksburg, on the south bank of the Rappahannoc, 110 miles from the mouth, and 66 miles north of Richmond, is a flourishing commercial town in a healthy and pleasant situation. It is near the head of the navigation of the Rappahannoc, up to which town vessels of 130 or 140 tons burthen can ascend. There is a town-house, a mansion-house, a market-house, two banks, a Lancastrian school, and four churches, Episcopalian, Baptist, Presbyterian, and Methodist. It exports annually a large quantity of corn, flour, tobacco, &c. The port of entry is at Tappahannoc, about 70 miles below Fredericksburg. The population is about 4000.

Of *James Town*, where the first colony was settled and which was once a large place, not a single house remains. It was the chief seat of the colonial government from [illegible] till 1698, when Williamsburg was made the capital, and continued to be so till 1779, when Richmond became the seat of the first American state government.

Lexington is seated near the North River, a tributary of the James River, 156 miles west by north from Richmond. It was built originally of wood, but having been destroyed by fire in 1794, the houses are now mostly of brick. Its public buildings are, Washington College, a state arsenal, and three churches. The inhabitants are about 1000.

Lynchburg, a flourishing commercial town, is on the south bank of James River, 20 miles below the [illegible] Falls where the river passes through the Blue Ridge, and 120 miles west-south-west from Richmond. It has considerable trade, not only with western Virginia, but with North Carolina, Tenessee, Kentucky, and Ohio. The produce brought to market, consisting of tobacco, wheat, flour, hemp, &c., is conveyed in boats to Richmond, whence it is shipped to foreign markets. It has a court-house and three churches. The population is between 5000 and [illegible]

Mount Vernon, the mansion of Washington, where he died, and near which he was buried, stands on a bold promontory overhanging the Potomac, which is here a mile and a half wide. The tomb is above ground, and his remains are deposited in a white marble sarcophagus, with a flat cover, on which is sculptured an eagle in relief, the American stars and stripes, and the name 'Washington.' A similar sarcophagus near it contains the remains of his wife, with the inscription 'Martha, consort of Washington.'

Norfolk is situated on the north bank of Elizabeth River, about eight miles from its junction with the James River, and 114 miles south-east from Richmond. The harbour is excellent, sheltered from all winds, has depth of water for the largest vessels, shallow anchorages for smaller ones, and good holding-ground for all. The town is built on a plain, the streets are broad and well-paved, and the houses chiefly of brick. There is a court-house, a custom-house, an almshouse, a theatre, and eight churches, but none of these buildings are distinguished for architectural beauty. Norfolk, notwithstand- ng the excellence of its harbour, has little commerce.)n the opposite bank of Elizabeth River, distant about a mile, is *Portsmouth*, almost adjoining which is *Gosport*, at vhich is the Navy-yard. The population of Norfolk is ibout 12,000, and Portsmouth and Gosport together about 000; consisting of about 8000 whites, 6000 slaves, and .000 free coloured.

Petersburg is situated on the south bank of the Appo- nattox, about 12 miles from its junction with James River t City Point. The Appomattox is navigable for small essels as far as Petersburg, which is 23 miles south by east rom Richmond. The town, originally built of wood, was urnt down in 1815, and has been since rebuilt with brick. he plan of the town is regular and the houses substantial, ut the streets are badly paved, dirty, and entirely without mps. There are several public buildings—a City Hall, Masonic Hall, a Female Orphan Asylum, and seven urches belonging to Episcopalians, Baptists, Methodists, d Presbyterians. There is a newspaper published three mes a week. Manufactures and commerce are tolerably risk. The Falls above the town, as at Richmond, are sed for water-power, and a canal connects the river below e Falls with the River above, so as to continue the na- igation. There are eight tobacco-manufactories, seven our-mills, and two oil-mills. The exports are about 0,000 bales of cotton, 5000 hogsheads of tobacco, and 00,000 bushels of wheat. The population is about 0,000, of whom about 4000 are whites, 3000 slaves, and 00 feee coloured.

Springs.—The medicinal springs of Western Virginia e in great repute, and have become watering-places hich are resorted to from all parts of the state. The *ed Sulphur Springs*, 240 miles W. from Richmond, are ightly sulphurous, of the temperature of 54° Fahrenheit, d perfectly transparent, the name having been given to em from a reddish deposit which is observed on the rock t the bottom of the wells. There is a handsome esta- lishment for visitors, the number of whom is gene- ally about 200. The *Grey Sulphur Springs* are about ne miles E. from the Red Sulphur Springs. The visitors e about 50, generally from South Carolina. The *Salt ulphur Springs* are about 18 miles E. from the Red Sul- hur Springs. The *White Sulphur Springs* deposit a hite sediment: they are 38 miles N.E. from the Red Sul- hur Springs. There is a large establishment for visitors ere, the number of whom is from 600 to 800. The *weet Springs* are 204 miles W. from Richmond. The ater contains a small admixture of magnesia, soda, and on; the temperature is about 74° Fahr. There are swim- ing and plunging baths. The situation of all the springs is autiful, but this is most so. About 45 miles north-north- st from the Sweet Springs are a warm spring (98° Fahr.), d a hot spring (106° Fahr.), both enclosed.

Staunton, 120 miles north-west by west from Richmond, as two court-houses—one for common law and one for quity cases, a market-house, four churches, and, near the trance of the town, the Lunatic Asylum for Western irginia, a handsome edifice. The population is about 2000.

Wheeling, 357 miles north-west from Richmond, is tuated on a high bank of the Ohio, and on a strip f land so narrow as only to allow of three principal reets between the river, with which they are parallel, nd the steep hills at the back of the town, so that ll further extension must be made at the ends; these ree streets are of good breadth, with side-walks well- aved, other streets crossing at right angles. There are everal large manufactories of cotton and woollens. A rge new court-house is probably now finished. There is bank in form resembling the United States Bank of hiladelphia. There are five churches, Episcopal, Me- hodist, Catholic, Presbyterian, and Associate Reformed. he inhabitants are about 10,000, of whom about 3000 are egroes, chiefly slaves. Two weekly newspapers are ublished. The great National Road passes through Vheeling, which is projected to run from Cumberland, at hich the Philadelphia and Baltimore Roads meet, across laryland, Virginia, Ohio, Indiana, and Illinois, to Saint ouis in Missouri: it is completed as far as Columbus in hio. Eight stages daily arrive at and depart from Vheeling, carrying nine to twelve passengers each, and s many steamboats with from 50 to 100 passengers. Be- ween Wheeling and the Ohio side of the river is a large evel island, with a good navigable channel on each side; the Ohio channel is crossed by a bridge, and the Virginia channel by a curious floating ferry.

Williamsburg, which lies inland between James River and York River, was formerly the legislative capital of the province, but is now a declining town, with about 1000 inhabitants. The only building of importance is the college of William and Mary. There are still remains of the old government residence and the legislative hall. It is 60 miles east-south-east from Richmond.

History.—The early history of Virginia is the history of the establishment of British colonies in North America. The first discovery of the American coast by the English had been made by Sebastian Cabot as early as 1497, and further discoveries were afterwards made by him, as well as by Columbus and Vespucci. Frobisher was sent out in 1576 by Queen Elizabeth to seek a north-west passage, and on his return was knighted. In 1583 Sir Humphrey Gilbert reached Newfoundland, but died on his passage home. The next expeditions were sent out chiefly through the influence and partly at the expense of Sir Walter Raleigh. In 1584 he obtained a patent, and sent out two small vessels, which reached the coast of Florida, and sailed north as far as the island of Roanoke, in which neighbourhood they remained some time in friendly intercourse with the natives. On their return the country was named Virginia by Queen Elizabeth. In 1585 Sir Richard Grenville sailed with seven vessels, and settled 108 persons on the island of Roanoke, in the present state of North Carolina. They suffered extreme hardships, and must have perished if Sir Francis Drake had not fortunately arrived, and taken them back to England in 1586. Meantime Sir Walter Raleigh had sent out a ship plentifully supplied with necessaries, which were brought back to England when the settlers could not be found. Sir Richard Grenville, who had returned to England, also sailed, soon after the former ship, with three vessels, and, not finding the colony, left 50 more settlers. Relief and fresh emigrants were sent out in 1587 under Governor White, who, on reaching Roanoke, found only the bones of one man. He settled 115 more colonists, and returned to England, and in 1590 reached Roanoke again with supplies and recruits, but not one of the 115 settlers whom he had left was found, either then or afterwards.

In 1606 James I. granted patents to two companies. To the one, called the London Company, he granted South Virginia; to the other, called the Plymouth Company, he granted New England. On the 19th of December, 1606, a small expedition of 105 men in three ships, the largest not more than 100 tons burthen, having entered a river which was then called Powhatan, now the James River, they planted the first colony in the present state of Virginia, May 13th, 1607, on a peninsula connected with the north bank, and named the place James Town in honour of King James. Before autumn, fifty men, half the colony, had died, and such was the disunion among the rest, that the whole would probably have perished if the management had not fallen into the hands of Captain John Smith, whose courage and prudence preserved the little colony from destruction.

John Smith was born in 1579, at Willoughby, in Lincolnshire. The adventures of this extraordinary man, previously to his joining this expedition, in France, in Flanders, in Italy, in the Levant, in Austria, in Russia, in Germany, Spain, and Marocco, are more like a romance than a biography. Afterwards, when compelled to leave Virginia, and return to England, he commanded, in 1614 and 1615, two expeditions of trade and discovery to New England. In 1624 he published 'The Generall Historie of Virginia, New England, and the Summer Isles,' folio, London; and in 1630 'The True Travels, Adventures, and Observations of Captain Iohn Smith, in Europe, Asia, Africke, and America, beginning about the yeere 1593 and continued to this present 1629,' with a 'Continuation' of the History of Virginia, London, folio, both of which works were reprinted at Richmond, in Virginia, in 1819, in 2 vols. 8vo. He published also some works on Navigation, and some smaller works on America and other matters. He died in London, in 1631, in his 52nd year.

Smith, on an expedition up the James River and into the interior, in 1607, was taken prisoner by the Indians, and two men who accompanied him were slain. He himself, after being several days in custody, was saved from the tomahawk by the entreaties and interference of Pocahontas, the daughter of Powhatan, the principal chief, and he was ultimately allowed to return to James Town, now reduced to forty settlers. In 1608, 70 more emigrants arrived. Smith began to establish friendly relations with the natives, the country was gradually cleared, and under his active superintendence James Town began to assume the appearance of a fortified village.

In 1609 a new charter transferred to the London Company the powers which in the former the king had reserved to himself. Lord Delaware was appointed governor for life, and Sir Thomas Gates, Sir George Somers, and Newport, admiral of the fleet of nine vessels with 500 emigrants, were made commissioners to administer the affairs of the colony till Lord Delaware's arrival. A storm separated the fleet, and only seven ships reached Virginia. The new emigrants were for the most part a dissolute set of impoverished gentlemen and broken tradesmen. Smith however, with much difficulty, maintained his authority over them, till the accidental explosion of a bag of gunpowder inflicted injuries on his person which obliged him to return to England in 1609.

After Smith's departure the colony was soon abandoned to improvidence and idleness; the store of provisions was rapidly consumed; attacks were made by the Indians, stragglers were murdered, and plans laid to destroy the whole colony. Smith had left nearly 500 persons; in six months the number was reduced to 60.

The three commissioners had embarked in the same ship, and this ship was wrecked on the Bermudas. Out of the wreck of their ship and the cedars which they felled they built two vessels, in which they embarked for Virginia, where they arrived only to find a scene of extreme scarcity and distress. The whole body of colonists now resolved to embark for Newfoundland, and disperse themselves among the fishing-vessels, and before sailing down the river would have set fire to James Town if they had not been prevented by the firm resistance of Sir Thomas Gates. Before they reached the mouth of the river they met the long-boat of Lord Delaware, who had arrived in Chesapeake Bay with supplies and emigrants.

The 10th of June, 1610, was the memorable day of the restoration of the colony to its former seat. Sickness soon obliged Lord Delaware to return; but in the mean time Sir Thomas Dale had been sent out with liberal supplies; and at the end of August, 1611, Sir Thomas Gates landed 300 emigrants from six ships. The colony now amounted to 700 men. Gates was appointed governor, and founded, much farther up the river, a new 'plantation,' which he called Henrico, in honour of Prince Henry.

From this time the colony advanced in security and prosperity, which were especially promoted by the curious circumstance of a marriage solemnized according to the rites of the Church of England, between a respectable young Englishman, John Rolfe, and Pocahontas, who had more than once saved the life of Smith. The consequence was a confirmed peace with her father Powhatan, which he extended to other Indian tribes under his influence. Pocahontas sailed with her husband to England, and became an object of admiration both at court and in London, which her conduct as a wife and mother afterwards confirmed and continued. There are families still in Virginia who are proud of their descent from that union.

Sir Thomas Gates returned to England in March, 1614, leaving the government in the hands of Sir Thomas Dale. The use of tobacco, which had been introduced into England by Sir Walter Raleigh several years before the settlement of James Town, extended rapidly, perhaps more rapidly from the attempts of King James to prejudice his subjects against it; and it was soon found that it might be profitably cultivated in Virginia.

Few females had yet ventured to cross the Atlantic, but in 1619 'ninety agreeable persons, young and incorrupt,' were induced to embark, at the expense of the London Company, on a marriage speculation. In August, 1620, a Dutch ship of war entered James River, and landed twenty negroes for sale, which was the first introduction of negro slaves into the English colonies. In 1621 sixty more females were sent out, 'maids of virtuous education, young and handsome.' The first lot of females was bought by the colonists for 120 lbs. of tobacco each, but the second brought 150 lbs. each. These sixty females however only formed a portion of 1260 persons whom the energy of Sir Edward Sandys, the treasurer of the London Company, sent out in one year. Sandys was succeeded as treasurer of the Company by the earl of Southampton, the friend of Shakspere, and in July, 1621, a written constitution was bestowed on the colony, which was founded on the principles of the English constitution; a governor and permanent council were to be appointed by the Company; a general assembly was to be convened yearly, which might exercise full legislative power, subject to a negative by the governor and ratification by the London Company; and the courts of justice were to conform to the laws and manner of trial used in England.

Powhatan had died in 1618, and was succeeded by his younger brother, who was hostile to the English. In 1622 the Indians prepared to make a secret and simultaneous attack on the whole colony, preserving to the last moment the language of friendship. On the 22nd of March, 1622, at midday and in the same hour, 347 persons, children and women, as well as men, scattered in distant villages extending 140 miles on both sides of the river, were murdered with every aggravation of cruelty; but the massacre was limited to the distant villages. The night before the attack an Indian had revealed the plot to an Englishman whom he wished to save, and James Town and the nearest settlements were on their guard. The Indians fled from every place where they met with prepared resistance. A war of extermination ensued, and new supplies and assistance were promptly sent from England.

Soon after this a quarrel ensued between King James and the London Company, the result of which was, that in 1624 the patents were cancelled and the company dissolved. The management of the colony was entrusted to a governor and counsellors, who were limited to [illegible] Charles I. attempted to obtain a monopoly of the profits of the tobacco trade, but he was resisted by the colonists and the new governor, Sir John Harvey, who was very unpopular, was 'thrust out of his government,' and sent to England, in 1635, to be tried for attempting to betray the interests of the colonists. The commissioners sent over with Harvey were not even allowed to state the charges against him, and he was sent back to occupy his former station, which he retained till 1639.

On the 18th of April, 1644, another attempt to annihilate the colony by a general massacre was made by the Indians. They killed about 300 on the frontier settlements, but were soon repulsed, and fled to a distance. The prosperity and population of the colony, though checked for a time, afterwards advanced rapidly. In 1648 there were trading in Virginia ten ships from London, two from Bristol, twelve Dutch, and seven from New England, and the number of colonists was about 20,000.

Virginia was disposed to resist the republican government of England, but in 1652 was compelled to submit. In 1673 Charles II. granted the whole province of Virginia to the lords Culpepper and Arden for thirty-one years; and, besides this ground of offence, parts of the Navigation Laws were deemed highly injurious to the interests of the Virginians; revolts took place in 1663, 1671, and 1675, but they were suppressed; at length, in 1676, the colony broke out into open rebellion under a leader called Bacon, and the insurgents pillaged the houses of the royalists and set fire to James Town, which was reduced to ashes. An armament was sent out from England under Sir John Berry, but before it arrived Bacon had fallen sick and died, and the insurgents became dispirited, and were dispersed. From this time till 1688 the Virginians were in a state of continual collision with the king of England and the governor of the colony. In 1689, on the accession of William and Mary, a more liberal and conciliatory policy was adopted towards the colony, under which it continued to flourish till 1764, when the Stamp Act was proposed, and the American war, which broke out a few years afterwards, led to a separation of all the North American colonies from the parent state. The first state constitution of Virginia was adopted June 29, 1776.

(Smith's *Generall Historie of Virginia, &c.*; Bancroft's *History of the United States*; Buckingham's *Slave States of America*, vol. ii.; Dickens's *American Notes*; Martin's *Gazetteer of Virginia*; Tucker's *Life of Jefferson* (Introductory chapter); *Journal of Education*, vol. iv., 'Education in America;' *Encyclopædia Americana*; *American Almanac*, 1837, 1841, 1843.)

VIRGINIAN SNAKE ROOT. [Polygala Senega.]

VIRGI'NIUS. [Virginia.]

VIRGI'NIUS RUFUS, a Roman rhetorician of the time of Nero, who sent him into exile, as Tacitus says, merely because he was a man of reputation. (Tacit., *Annal.*, xv. 71; Dion Cass., lxii. 27.) He appears to be the same as the Virginius Flaccus who is mentioned in the antient 'Life of Persius,' and of whom this poet was a pupil. From Quinctilian (iii. 1, § 21; compare iii. 6, § 44; iv. 1, § 23; vii. 4, § 24; xi. 3, § 126), who speaks of him as his contemporary, we learn that he wrote a work on rhetoric, which was more accurate than those of his predecessors; but no fragments of this work are extant. Some modern critics have supposed Virginius Rufus to be the author of the 'Rhetorica ad Herennium,' which is usually printed among the works of Cicero; but nothing certain can be said about the matter. (Schütz's Prooemium to his edition of Cicero's 'Opera Rhetorica.')

VIRGO (Constellation), the sixth constellation in the zodiac, surrounded by Libra, Bootes, Leo, and Corvus. It is best known by two remarkable stars: the first, Spica (α Virginis), a star of the first magnitude, is in the hand, which holds ears of corn, typical of the harvest, which approached in the time of the Greeks as the sun neared this star; the other, Prævindemiatrix, or Vindemiatrix (ε Virginis), took its name from the vintage. The star Spica forms a remarkable triangle with Arcturus and β Leonis (or Denebola); and of the bright stars in this triangle, Vindemiatrix is the one nearest to the line joining Arcturus and β Leonis.

The principal stars are as follows:—

Character. Not in Bayer ( ).	No. in Catalogue of		Magnitude.	Character. Not in Bayer ( ).	No. in Catalogue of		Magnitude.	Character. Not in Bayer ( ).	No. in Catalogue of		Magnitude.
	Flamsteed. Piazzi ( ).	Astron. Society.			Flamsteed. Piazzi ( ).	Astron. Society.			Flamsteed. Piazzi ( ).	Astron. Society.	
ω	1	1363	6	θ	51	1511	4	ι	99	1619	4
ξ	2	1369	5		53	1514	4½	λ	100	1624	4
ν	3	1371	5		55	1517	6	υ¹	102	1626	5
A¹	4*	1372	6		57	1519	6	υ²	103	1629	5
β	5	1376	3		58	1521	6	(N¹)	104	1638	6
A²	6	1380	6	e	59	1520	6½	φ	105	1640	4
b	7	1385	5½	σ	60	1522	5	(N²)	106	1641	6
π	8	1386	5		61	1523	4½	μ	107	1665	4
o	9	1392	5		62	1528	6	(Z)	109	1674	4
(r)	10	1397	6		63	1530	6		110	1706	4½
(s)	11	1399	6	(u)	64	1529	6		(12)	1614	6
(t)	12	1405	6½		65	1531	6		(16)	1516	6
	13†	1412	6		66	1532	6½		(21)	1518	7
(H)	14	1413	6	α	67	1533	1		(22)	1617	6
η	15	1415	3	i	68	1535	6		(91)	1432	6½
c	16	1417	6½	(P)	69	1536	5½		(95)	1540	7
	17	1422	6	(w)	70	1538	6		(95)	1434	7
	20	1445	6		71	1541	6		(104)	1438	6½
q	21	1446	6		73	1543	6		(111)	1443	6½
f	25	1454	6	l¹	74	1545	6		(126)	1364	7
χ	26	1460	5		75	1546	6		(142)	1458	7
	27	1464	6	h	76	1547	6		(143)	1459	6½
	28	1467	6		77	1548	7		(148)	1367	6½
γ	29	1465	3		78	1549	6	(γ²)	(158)	1466	4
ρ	30	1468	5	ζ	79	1550	4	(B)	(167)	1377	6
d¹	31	1469	6	l²	80	1551	6		(174)	1559	7
	33	1472	6½	m	82	1556	6		(179)	1561	7
	34	1475	6		83	1560	6		(183)	1476	6½
	35	1477	6	o	84	1558	6		(196)	1480	6½
	37	1481	6		85	1564	6		(203)	1383	7
	38	1484	6	(O)	86	1565	6		(213)	1388	7
ψ	40	1488	5		87	1567	6		(222)	1390	7
	41	1487	6	n	88	1571	6		(230)	1393	7
	42	1490	6	(x)	89	1574	5½		(238)	1585	7
δ	43	1491	3	p	90	1584	6		(262)	1502	6½
k	44	1495	6	τ	93	1598	5		(269)	1593	7
	46‡	1496	6		94	1604	6		(270)	1594	7
ε	47	1499	3		95	1606	6		(286)	1600	6½
	48	1500	6	(y)	96	1608	6		(287)	1601	7
g	49	1506	5		97	1613	7		(317)	1610	6
	50	1510	6	κ	98	1615	4				

Hesiod and Aratus unite in representing Virgo to be Justice, who retired to Heaven when the golden age came to an end: the former makes her the daughter of Jupiter and Themis; the latter, of Astræus and Aurora: others make her to be Fortune, others Ceres, &c.

VIRIA'THUS or **VIRIA'TUS** (Οὐιρίαθος), the leader of the Lusitanians, in Hispania, in their war with the Romans, about the middle of the second century B.C. He is first mentioned on the occasion when the Roman praetor Servius Galba treacherously massacred a large body of the Lusitanians (B.C. 150). Viriathus was one of the few who escaped. In the year 149 B.C., a Lusitanian army having been defeated by Caius Vetilius, the fugitives, who were blockaded, were on the point of surrendering, when Viriathus, who happened to be present, reminded them of the treachery of Galba, and by a bold and skilful manœuvre released them, and was appointed their general. In a battle which took place shortly afterwards, he defeated and killed Vetilius. In the three following years he defeated successively the praetors C. Plautius, Claudius Unimanus, and C. Nigidius Figulus. The next year (B.C. 145) the Romans sent against him the consul Q. Fabius Maximus Aemilianus, who checked his successful course in this and the following year. In 143 B.C. Viriathus was again successful against the propraetor Q. Pompeius, whose successor, Q. Fabius Maximus Servilianus, carried on the war during the next two years with various success. At length, in B.C. 140, the consul Q. Servilius Caepio obtained the person of Viriathus by the treachery of some of that chieftain's intimate friends, and put him to death, after he had led the Lusitanians for eight years, or, as others say, fourteen, reckoning from the beginning of the Celtiberic war in B.C. 153.

The Roman writers say that Viriathus was first a shepherd and huntsman; then a leader of robbers, by which they mean what a modern Spaniard would call a Guerilla chieftain; and at last a great commander, who, had fortune favoured him, would have founded an empire much greater than his native country, or, as Florus expresses it, would have been the Romulus of Spain.

(Appian, *De Reb. Hisp.*, 59-75; Liv., *Epit.*, lii., liv.; Diodorus Siculus, x., p. 72-80, 97; Valerius Maximus, vi. 4, § 2; ix. 6, § 4; Obsequens, 81, 82; Orosius, iv. 21; Florus, ii. 17; Eutropius, iv. 16.)

VI'ROLA SEBI'FERA, a large tree of Guyana, which belongs properly to the genus Myristica, and is in fact by some called nutmeg of Cayenne, and has the same properties as many of the other species of that genus. When incisions are made into the bark, a reddish glutinous juice exudes, which, when fresh, is used as a caustic, and which concentrates in time. The mace is of a red colour, and within it the kernel is of a whitish colour, which, when powdered and put into boiling water, yields a yellowish-coloured fatty substance which swims on the surface; it is caustic in taste, and has a slight odour of nutmeg. In the country candles are made of it, hence Europeans call the tree *Porte Suif*. The natives of Oyapoi call it voironche; the Galibis, ayapa and virola, which was adopted as the generic name. M. Bonastre says it yields by distillation only a small quantity of essential oil, which is lighter than water. This vegetable fat or tallow is sometimes met with in commerce in square loaves. It is less fitted for affording light than ordinary tallow, because it melts at a lower temperature. It is unsuitable for plasters because it is caustic: semitransparent soap is however sometimes made with it.

VIRTUAL VELOCITIES. The name of the *principle of virtual velocities*, which is given to what is perhaps the most important generalization in mechanics, is very ill fitted to express the idea which is to be conveyed. It will take some space to prepare even the mathematical reader, unless he be already acquainted with the subject, for the reception of this principle as a real and physical consequence of the laws of matter. As long as it is only treated as a mathematical mode of expressing geometrical conditions, its import is hardly seen, and its value is lessened by a want of perfect conviction.

Our works on mechanics are now written in so very cold a style, and mathematical deduction has so completely taken the place of everything else, that little space is given even to interpretation of results, and none to illustration of first principles. The consequence is, a strong leaning to purely mathematical definitions, which, though they place the student in the smallest possible time at the beginning of his career of deduction, nevertheless make it difficult for him ever to connect his first principles (first equations we ought rather to call them) with the actual properties of the matter around him, and with the phraseology which sight and touch make him feel to be justifiable. We do not like the system of mechanics in which velocity is only $ds : dt$, moving pressure but a name for $m\,dv : dt$, and the principle of virtual velocities nothing but a nickname for $\Sigma P dp = 0$. For a proper description of real facts, we would rather that nature should *abhor* a vacuum, that fluid should *try* to find its level, that the centre of gravity should *endeavour* to descend as low as possible, and so on. Of such language the mathematician must allow the use, if the learner is to feel the truth of the results of mechanics: and in no case is such permission of more importance than in the illustration of the principle before us.

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* Called ξ² by Flamsteed, but evidently (according to Baily) the first of the stars marked A by Bayer.

† This star has been marked a by mistake.

‡ 18, 19, and 45 Virginis are the consequences of errors in copying, and do not exist in the heavens.

When we say that any system whatever is in equilibrium, under the action of forces, it is obvious that the word equilibrium is only used for a state of rest, as opposed to one of motion; which last is possible to be imagined, and might actually take place, if it were not that the impressed forces mutually counteract each other's effects. If a system could not move, if so many of its points were fixed that, consistently with those points remaining fixed, no geometrical possibility of motion was left, it would be useless to ask whether any given set of forces would keep that system in equilibrium or not. For the answer would be that the system must be in equilibrium, forces or no forces. But when it is left possible that a system may move, it then becomes a question whether a given set of forces will entirely prevent all motion, or will cause one of the possible motions to begin: and the alternative may be restricted by the use of as small a portion of time as we please. What will take place during the first millionth of a second after the forces are applied, rest or motion? And instead of the millionth of a second, any smaller fraction may be used; so that we may say the question of rest or motion, the settlement which of the two is to take place, may be considered as one which involves but an infinitely small portion of time. We shall throughout this article use the language of the infinitesimal calculus, leaving it to the reader to reduce it to the stricter form, if he think that there is such a thing.

Now all the different infinitely small motions of which it is possible that a system may take any one during the infinitely small time dt which elapses after forces are applied to it—are called *virtual* motions. This word is not used in the meaning which it commonly bears, as when we say that a man who does not prosecute a claim virtually (as good as) abandons it. When John Bernoulli used this adjective (and we can find none prior to him who did so) it was in a sense which it will not now bear: by a virtual velocity he meant any infinitely small velocity, or increase of velocity. But in modern times, virtual is used in the sense of potential, or possible: a virtual motion is one which a system might take, whether it take it or not: thus if forces keep a system at rest, it will not take any one whatsoever of the virtual (or possible) motions; but if they do not keep it at rest, it will, in the time dt which elapses after the forces are applied, take some one of the virtual motions, to the exclusion of the rest. Nevertheless, as long as it is geometrically possible that any one given motion might have taken place, we are at liberty to suppose that that motion has taken place (which is simply making an arbitrary displacement of the system), if by so doing, and noting the displacements which the different parts receive, we can draw any conclusions as to the conditions of equilibrium.

When we see a system in equilibrium, experience tells us that there are efforts at motion which are counteracted. Remove any one of the forces, or any part of one of them, and motion immediately begins. It is true that friction and other resistances prevent our having so good a perception of this truth as we otherwise might have; since, when equilibrating forces are removed in whole or in part, friction frequently supplies the place and maintains the equilibrium. A little reflexion will however make it apparent that when a system is once in equilibrium, no addition or subtraction of forces can be made without producing motion, unless the forces added or withdrawn be such as by themselves would maintain equilibrium.

A system, then, at rest, makes efforts to move, which efforts are counteracted; and the mathematical conditions of equilibrium, whatever they may be, must express that every force endeavours to produce motion; must contain, directly or indirectly, a measure of the energy of that force; and must show that a complete counteraction of all the efforts at motion takes place. But here arises a question, and one which is of the utmost importance in the comprehension of our principle. The number of virtual motions is usually infinite:—Does any given system of forces make an effort to produce every one of them, or some only? We know that, if the forces do not produce equilibrium, one of the virtual motions ensues in the first dt following the application of the forces, to the exclusion of all the rest: it ought not therefore to surprise the student if he were told that, for every given set of forces (the given system being always understood), some one motion prevented is every motion prevented. But in point of fact the direct contrary is true, in rigid systems at least: generally speaking, there is but one class of virtual motions which a given set of forces has *not* a tendency to produce, and any one of the rest may be produced. Our meaning will appear in the following explanation:—We have seen [ROTATION, p. 177] that every infinitely small motion of a rigid system may be produced by a screwlike motion*, namely, rotation round an axis, accompanied by a slipping up or down that axis. Take any line for an axis, and suppose a screw, fitted to its receiving screw (the latter immoveably fixed in space), to be described with that axis; suppose also that the system to which the forces are applied is fixed to the screw. Here then is every virtual motion prevented, except one; so that if the system begin to move, it must take that one motion. Now apply the given set of forces, and resolve them all in directions parallel to the axis, and in planes perpendicular to it. There must be motion unless the former forces destroy each other, and the latter have a resultant or resultants passing through the axis. Consequently, with certain exceptions (which, though infinite in number, are few compared with the rest), a given set of forces, acting on a given system, will produce any virtual motion, if others be excluded: but when there are various virtual motions not excluded, the system, if the forces do not balance one another, will take one in preference to any of the rest. The preceding argument ought to be more developed, but we have not room for such an explanation as would be intelligible to every one: most of the difficulty indeed lies in the purely geometrical conception of motion, and is foreign to our article.

We are to expect, then, as the condition of equilibrium, a collection of conditions, an infinite number, implying that, of an infinite number of motions, possible *à priori*, the given system of forces makes each and every one impossible. To make it appear in what the condition can probably consist, look at the following cases:—If one point of the system be fixed, forces applied at that point are useless, for they only produce a pressure or strain on the fixed point, and neither promote nor retard any virtual motion. If one point be restrained to move upon a given surface or curve, forces perpendicular to that surface or curve are useless, for a similar reason. Thus suppose one point must be retained on a given horizontal plane: any weight added to that point has no effect on the equilibrium; it is merely equivalent to so much weight laid upon the plane.† Generally then, a force produces no effect in equilibrium unless the point to which it is applied can move *in the direction of that force:* thus weight produces no effect when applied to a point of which all the virtual motions are horizontal. But let the plane be ever so little inclined to the horizon, and a point restricted to move upon it has somewhat of vertical motion: weight applied at that point will have some effect in equilibrium. It would be natural to conclude (and let it be remembered that in these *à priori* views we are only stating strong probabilities) that the more freely a point may move in the direction of the force which acts upon it, the greater the effect of that force in producing or disturbing equilibrium. Now since it is sufficiently evident that, *cæteris paribus*, a force has more or less effect in proportion to its

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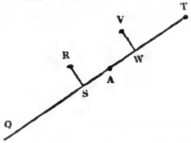
* Simple translation is the extreme case in which the thread of the screw becomes parallel to the axis; and simple rotation the other extreme case, in which the successive coils of the thread coincide.

† Here again the common ideas derived from friction must be abandoned: a weight attached to such a point might help, by the friction on the plane, to equilibrate the system.



magnitude, for instance, that, under given circumstances, two pounds of pressure produce twice the effect of one pound, it seems that for any given virtual motion, the effect of each force varies jointly as the magnitude of the force, and the length over which, in that virtual motion, the point of application moves in the direction of the force. That is, suppose A to be the point of application of the force, and AQ to represent its direction and magnitude. In one virtual or possible motion of the system, let A be transferred to R, infinitely near to A. Draw RS perpendicular upon QA, then AS is the space moved over in the direction of the force; and if the force contain P units of pressure, P × AS is the product on the value of which the efficiency of the force seems to have some dependence. Here however the motion AS is in the direction of the force, and the force helps to produce that motion; for it is obviously easier, *cæteris paribus*, that the point A should move in the direction AR, when the force acts in the direction AQ, than it would have been if the same force had acted in the opposite direction AT. But suppose that another virtual motion might bring A to V. Draw VW perpendicular to AT; then AW is the space moved over in the direction of the force, and P × AW is the product on which the efficiency of the force seems to depend. But here the motion AW is in the direction opposite to that of the force, and it is obviously less easy that the point A should move in the direction AV, when the force acts in the direction AQ, than it would have been if the force had acted in the opposite direction AT. Hence, to what has preceded, we may probably add that the efficiency of a force, in promoting or preventing one given kind of virtual motion, is to be considered as of one kind or another according as, for that motion, the virtual motion of the point of application, estimated in the line of action of the force, is with the direction of the force, or opposite to it.

These conjectures, for they are nothing more, will show of the principle of virtual velocities, the moment it is announced, that it is a highly reasonable and probable principle. It may be announced as follows:—Let the forces which are applied to a system, at different points, be P, Q, R, &c., each in an assigned direction. Let one of the virtual (that is, possible) motions which the system may undergo in the infinitely small time dt succeeding the moment of application of the forces, be supposed to be given, upon trial. Decompose the several motions of the points of application of the forces each into two, one in the line of the applied force, the other perpendicular to that line: let dp, dq, dr, &c. be the resolved motions in the lines of the forces, and let those be reckoned positive which are in the directions of the forces, and negative which are in the contrary directions. Then $Pdp + Qdq + Rdr +$ &c. is a quantity on which it depends whether the given virtual motion can actually take place, or not. If $Pdp + Qdq + Rdr +$ &c. $= 0$, that motion cannot be the result of the applied forces: but if $Pdp + Qdq + Rdr +$ &c. be not $= 0$, that motion *may* take place. And there is equilibrium, that is, no one of the possible motions can actually take place, when $Pdp + Qdq + Rdr +$ &c. is always $= 0$, for every virtual motion; and there is not equilibrium when one or more virtual motions can be assigned, for which $Pdp + Qdq + Rdr +$ &c. is not $= 0$. This is the principle of *virtual velocities*, as to which perhaps the first thing that will strike the reader is that the word velocity does not occur in the explanation of it. But if we suppose the virtual motion of the system to be actually performed in the time dt, then the velocities of the points of application, in the directions of the several forces, are $dp:dt$, $dq:dt$, $dr:dt$, &c., and the principle above stated may be affirmed of

$$P\frac{dp}{dt} + Q\frac{dq}{dt} + R\frac{dr}{dt} + \&c.,$$

instead of $Pdp + Qdq + Rdr +$ &c. But the latter is the more convenient of the two. The product Pdp is called the *moment* of the force P, which is not a well-chosen term, since 'moment' is used in other senses. It would be much better (though we shall not here depart from established usage) that Pdp should be called the measure of the equilibrating power of the force P, or, in one word, the *power*[*] of the force P: with reference, of course, to the promotion or hindrance of those virtual motions only, in which dp is the part of the motion which is in the line of P's action. No perfectly general proof of this principle has been given; indeed to apply it demonstratively to the cases of fluid and gaseous systems would require a knowledge of the constituent parts of matter, and of their connection with each other, which we do not possess. But the cases in which it can be strictly shown are very extensive: all cases whatsoever in which the conditions of equilibrium can be established admit of the truth of this principle being shown *à posteriori*, with certain exceptions, the reasons of which will presently appear; and when it is assumed, it always leads to results which are consistent with the other known principles of mechanics. In the demonstration which we give, we shall confine ourselves to the case of forces which act upon points, which are either independent of each other, or some or all of which are connected by rigid rods without weight: and our limits require us to speak but briefly of all the steps which are purely mathematical. Ordinary works on mechanics give the simple illustrations which the beginner wants: and it is impossible to read anything like a general demonstration without being well acquainted with the infinitesimal calculus and with the principal formulæ of algebraic geometry of three dimensions.

First, let there be a single point A, the coordinates of which are x, y, and z. Let there act upon this point the forces P, in a direction which makes with the axes, angles α, β, γ; P′, the direction of which makes angles α', β', γ', &c. Let the point A move to B, the coordinates of which are $x + dx$, $y + dy$, $z + dz$, and let AB make the angles λ, μ, ν with the axes. Then

$$AB = \surd(dx^2 + dy^2 + dz^2),$$

$$\cos\lambda = \frac{dx}{AB}, \quad \cos\mu = \frac{dy}{AB}, \quad \cos\nu = \frac{dz}{AB}.$$

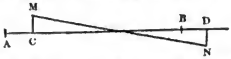
Now the line AB decomposed in the direction of P, gives AB × cos (angle made by P with AB) or

$$AB\,(\cos\lambda\,.\,\cos\alpha + \cos\mu\,.\,\cos\beta + \cos\nu\,.\,\cos\gamma)$$

$$\text{or } \cos\alpha\,.\,dx + \cos\beta\,.\,dy + \cos\gamma\,.\,dz = dp.$$

Hence the moment of the force P is $P\cos\alpha\,.\,dx + P\cos\beta\,.\,dy + P\cos\gamma\,.\,dz$, and the sum of the moments of all the forces is $dx\,\Sigma(P\cos\alpha) + dy\,\Sigma(P\cos\beta) + dz\,\Sigma(P\cos\gamma)$, where $\Sigma(P\cos\alpha)$ stands for $P\cos\alpha + P'\cos\alpha' +$ &c., and so on. But when there is equilibrium $\Sigma(P\cos\alpha) = 0$, since $P\cos\alpha$, $P'\cos\alpha'$, &c. are the components of the several forces in the direction of x. For similar reasons $\Sigma(P\cos\beta) = 0$, $\Sigma(P\cos\gamma) = 0$, whence $Pdp + P'dp' +$ &c. is $= 0$ for every motion of which the point is capable.

Let there be any number of points, and let each of them be acted upon by any number of forces: but as all the forces which act upon a given point may be reduced to one, let R_1 be the force which acts on the first, and α_1, β_1, γ_1 be the angles it makes with the axes: let R_2, α_2, β_2, γ_2, stand in the same relations to the second point; and so on. Let x_1, y_1, z_1, be the coordinates of the first point, and so on. Let any of the points be connected by rigid bars without weight: and suppose A to be one of the points, and AB the bar connecting it with another point B. The point A, then, besides other forces, is acted on by a pressure called the tension of the bar, either in the direction AB or BA: while B, besides the other forces, is acted on by the same tension, but in a contrary direction. Supposing AB to receive one of its virtual motions, and to come into the position MN (which need not be in the same plane with AB), then if MC and ND be drawn perpendicular to AB, and if the position MN be infinitely near to AB, so that MC and ND need not be distinguished (as far as small quantities of the first order are concerned)



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[*] Either of the words activity, efficiency, energy, would do as well; any thing but moment, which has other meanings.

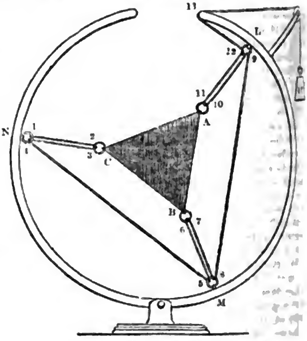
from arcs of circles with the centres B and A—it follows that AC may be considered as the diminution of the line if A only changed place, and came to M, while BD may be considered as the quantity by which it would be lengthened, if B only changed place, and came to N. Hence, since the bar remains of the same length, we have AC = BD, or at least the two only differ by an infinitely small part of either. But AC gives the virtual velocity of the tension at A, and BD that of the tension at B, and these lines being equal, and the tensions equal, their moments are equal; but these moments have different signs, one of the virtual velocities being in the direction of its force, and the other in the opposite direction. Hence the sum of these two moments is $= 0$; and the same follows for the two moments of any other of the tensions, exerted by any other of the connecting bars. Let T_1 be the sum of the moments of the tensions which act on the first point, T_2, T_3, &c. of those which act on the second, third, &c. points; then, taking the principle as established above, for each point separately, we have $R_1\,dr_1 + T_1 = 0$, $R_2\,dr_2 + T_2 = 0$, &c.; by summing which we have $R_1\,dr_1 + R_2\,dr_2 +$ &c. $+ T_1 + T_2 +$ &c. $= 0$. But $T_1 + T_2 +$ &c. $= 0$; for, as shown, every term in each of T_1, T_2, &c. finds an equal and contrary term in one of the others. Hence $R_1\,dr_1 + R_2\,dr_2 +$ &c. $= 0$, or the principle is established for any system consisting of forces applied to points connected by rigid bars, and this whether there be connections enough to ensure complete stability of form or not.

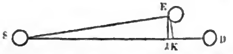
Various other cases may be examined in which the same conclusion as the last will be arrived at, namely, that the principle of virtual velocities is true of the external forces only, and that those which arise from the internal forces of the system may be neglected. If, for example, one of the points to which a force is applied slide upon a string, in the manner of a bead, the ends of the string being attached to other points of the system, the two tensions are the same on both sides of the bead, and any virtual motion of the bead alone shortens one part of the string as much as it lengthens the other. Those parts, by which one side is lengthened and the other shortened, are, when the motion is infinitely small, the spaces from which the virtual velocities of the tensions are obtained, and they are of contrary signs. The moments of the tensions are therefore equal and contrary; or the principle is true independently of those tensions. Again, suppose one of the points of the system is restrained to move upon a given surface or curve; being tied in such a manner as to slip freely upon the surface or curve, without being able to leave it. The force which retains the point thus attached is perpendicular to the surface or curve, but every virtual motion of that point is (when infinitely small) in the tangent plane of the surface or tangent of the curve: so that there is no component in the direction of the force, and the moment of the force vanishes.

When questions occur in which friction is an element, the principle of virtual velocities is not of very easy application. Even in the ordinary modes of solving such problems, the formulæ which must vanish when there is no friction, are not required to vanish, but must lie between certain positive and negative limits, depending on the friction. A similar change must be predicated of the sum of the moments of the impressed forces: but as even Lagrange does not appear to have thought the principle before us conveniently applicable to friction problems, we may well dispense with the consideration of them here. When elastic bodies are in question, the principle can be applied, but only on condition that the elasticities of the several parts of the system are considered as external, not internal forces: an hypothesis rendered necessary by our ignorance of the molecular constitution which gives rise to elasticity. It may also be said that in its application to hydrostatics there are mathematical conventions (expressive, no doubt, of truths, but foreign to the mere enunciation of the principle) which represent our ignorance of the molecular constitution of a fluid. On this point we should recommend the student who has enough of mathematics to have recourse to the *Mécanique Analytique* of Lagrange, the standard work on virtual velocities: the demonstrations, so called, given by all the elementary writers we know of (even Poisson, see his *Mécanique*, vol. ii., p. 512, 2nd edition) are mere illustrations conducted upon the most limited suppositions. These are more than excusable, considered with reference to the supposed mathematical knowledge of the reader; but it is not right to make him believe that he is considering a subject generally, when nothing but a limited case is presented to him. The great fault of the mathematical writers of our day is the want of *avowal of incompleteness:* and any one who looks in Poisson's table of contents for 'Démonstration du Principe des Vitesses Virtuelles dans l'Equilibre d'un Liquide,' and compares it with the article indicated, will see a notable instance.

When we look at the preceding demonstration of the principle, we see that it depends upon knowledge of the mode of compounding and decomposing forces; but there is an *à priori* proof of a most singular character, as extensive as can be given by the mode already used. The proof was prefixed by Lagrange to the 'Mécanique Analytique,' and judging from the slight degree of notice which it has obtained from succeeding writers on mechanics, we should suppose that it was disputed or thought unsound. We have ourselves strong objections to the form given by Lagrange; but we believe that a sound and sufficient method of proof does exist in the principle which he has used; and this we shall endeavour to develope.

Suppose, first, that all the forces which are applied are equal to one another; the case of unequal forces will follow very readily. As an instance, suppose three equal forces applied at the points A, B, C, in the directions AL, BM, CN; ABC being a solid triangle without weight. At A, B, C, attach rings[*] to the triangular system, and at L, M, N, attach rings to a solid frame unconnected with the system, except by the flexible string now to be mentioned. Let this string be made fast to the ring N at 1, from





whence let it be carried through the ring C, and again through the ring N at 4, from whence it is passed through M at 5; being nowhere attached to the frame except at 1. Its course is then denoted by the numbers 1, 2, 3, 4, &c. and, when it emerges at 14, let a weight be attached, equal to the half of the force which is required to act at each of the points A, B, C; this force being P, the weight is ½P. The tension of the string being everywhere the same, it is everywhere equal to ½P: and at the point A each of the parts of the string, (10, 9) and (11, 12), applies a force equal to ½P, so that the force P is, from the two strings, applied at A. The same may be said of the points B and C. If then, at the outset, the system ABC were so placed that forces P, P, P, applied at the three points in the given directions would produce equilibrium, it follows that there will be no motion when the weight ½P is made to act on the string; for equilibrating forces will at that instant be applied to the system: and the weight ½P cannot move unless the triangle move.

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[*] Pulleys, in Lagrange; but the wheel in the pulley is only a friction-wheel, and, as we are at liberty to dispense with friction in our thoughts, we may also deprive the pulley of its wheel.

Now it is obvious *à priori* that if any forces keep a sysem in equilibrium, forces exactly opposite to those forces ill also keep it in equilibrium: if P, Q, R, keep a system n equilibrium, so will −P, −Q, and −R, forces equal nd opposite to the first three. For it is obvious that all he six, P, −P, Q, −Q, R, −R, keep it in equilibrium, eing three sets of equilibrating forces. Take away the et P, Q, R, which, by hypothesis, equilibrate the system, nd the remaining set, −P, −Q, −R, will then equilirate it. But here it must be noticed that when the inersion of directions is made, the inversion of the tensions nust also be possible: a force which before the inversion ulls by a string, must, after the inversion, be supposed o push that string: that is to say, the string must have he property of a rigid bar as to pushing or pulling being ndifferent. The reader of theoretical mechanics must acustom himself to the idea of a string which, though lateally flexible, can transmit a push or thrust in the direction f its length. Imagine the direction* of gravity to be hanged in the machine, so that $\frac{1}{2}$P acts upwards, the tring being capable of transmitting the thrust through the hole of its length. Nothing is then changed except the irections of the forces acting at A, B, C, in such manner hat, if the original position be one of equilibrium, the eight $\frac{1}{2}$P cannot ascend, any more than it could descend n the first supposition.

When there is equilibrium, then, the weight $\frac{1}{2}$P, whether t is supposed to pull downwards or thrust upwards, cannot ither ascend or descend. But what is to hinder $\frac{1}{2}$P from escending in the first case, or ascending in the second? he weight is only counterbalanced at 1, which is made ast to the ring at N, and if more string can be drawn out eyond (13) by the descent of $\frac{1}{2}$P, or pushed in by its asent, there is no mechanical reason why such drawing out r pushing in should not take place. The reason why the scent or descent cannot take place must be of a geomerical character, and Lagrange reasons as follows:—It will e sufficient that any infinitely small displacement of the riangle ABC should produce no displacement of the eight; and this will also be necessary: for if any possible nfinitely small displacement of the system could let out tring and give motion to the weight, the tendency of the eight to descend would produce that small displacement. ut (implies Lagrange) it is enough that any infinitely mall displacement of the system should only produce a isplacement of the weight which is of an inferior order; r it is enough that the second displacement should be an nfinitely small part of the first. Here we cannot follow he reasoning: why should the weight not be capable of escending because the first infinitely small motion of BC is attended by one of an inferior order in the weight P? We could name any number of cases in which connued motions begin in this manner. We can only underand Lagrange's argument to this extent: if there be a potion of equilibrium at all, it must be that in which a given nfinitely small displacement produces the smallest effect pon the weight; so that, if there be one position in which very displacement produces relatively an infinitely small isplacement of the weight, that position, or none, must e the position of equilibrium. We shall however proceed ith Lagrange's reasoning, and shall then endeavour to how that it may be saved from the preceding objection at east, if not rendered absolutely rigorous. Let S be the ixed ring to which D (moveable with the system) beongs; and let the latter, in a certain infinitely small dislacement of the system, be removed to E. If SD be reater than SE, the string SD is shortened by the removal, nd drawing the arc EK and the perpendicular Ek, the irtual velocity of the force acting in the direction DS is D (and is positive), while the quantity by which each tring is shortened is KD; but if SE be longer than SD, he virtual velocity is negative, and the string is lengthened. Hence, if α, β, γ, be the virtual velocities of the forces in heir own directions, the expression $2\alpha + 2\beta + 2\gamma$ is, if ositive, the quantity of string let out by the displaceent; if negative, the quantity taken in. Or rather we hould say that $2\alpha + 2\beta + 2\gamma$ differs from the quantity let ut or taken in by an infinitely small quantity of the seond order; for kD and KD, even when E is infinitely ear to D, are not equal, but differ by a small quantity of he second order. Lagrange, then, confounding an infinitely small quantity of the second order with absolute *nothing*, compared with one of the first order, takes $2\alpha + 2\beta + 2\gamma = 0$, or, multiplying by $\frac{1}{2}$P, $P\alpha+P\beta+P\gamma=0$, as the condition that an infinitely small displacement of the system will allow no displacement whatever of the weight; from which, by the aid of the mathematical consideration already alluded to, he completes what he gives as the proof that $P\alpha + P\beta + P\gamma = 0$ is the condition of equilibrium: which is for this case the enunciation of the principle of virtual velocities.

Before proceeding to give our view of the manner in which this proof may be amended, we shall point out how to proceed when the forces are not equal. In such case they are either commensurable or incommensurable: let them be commensurable, and let them be lP, mP, nP, where l, m, n, are integers. Instead of passing the string twice only through each ring, pass it $2n$ times through C and N, $2m$ times through B and M, $2l$ times through A and L. Then, the instant the weight $\frac{1}{2}$P is applied, there are $2l$ strings in the direction AL, each with the tension $\frac{1}{2}$P, or altogether there is the force lP, applied to A in the direction AL; and similarly of the rest. If then, α, β, γ, be as before, we have $2l\alpha + 2m\beta + 2n\gamma$, differing only by an infinitely small quantity of the second order from the quantity of string let out or taken in by an infinitely small displacement of the system. The usual methods apply for the extension of this reasoning to the case in which the forces are incommensurable.

Let $AL = a$, $BM = b$, $CN = c$: then the whole length of the string as far as (13) is $2la+2mb+2nc+$ a constant made up of (4, 5), (8, 9), and (12, 13). Hence $2lda+2mdb+2ndc$ is the infinitely small quantity taken in or let out by an infinitely small displacement; taken in when positive, let out when negative; so that da, db, dc, answer to $-\alpha$, $-\beta$, $-\gamma$, in the preceding. Now

1. It is established that, equilibrium existing, equilibrium will remain when all the forces change their directions.

2. Neither a, b, c, nor their differential coefficients, can become infinite in any position of the system; so that the only way in which $2la+2mb+2nc$ can become a maximum or a minimum is by $2lda+2mdb+2ndc$ becoming, in the language of the differential calculus, *nothing*, that is, more strictly, an infinitely small quantity of the second order.

Now let the weight $\frac{1}{2}$P act *downwards*, and let it draw out all the string possible, and then rest. There must then be equilibrium, for every displacement makes the weight rise; and the weight has no tendency to take advantage, so to speak, of this power of rising. Consequently there must be equilibrum when $2la+2mb+2nc$ is a minimum, the weight acting downwards; that is, when $2lda+2mdb+2ndc$ is always positive, and of the second order; or when $Pl.\alpha+Pm.\beta+Pn.\gamma$ is always negative, and of the second order. And this equilibrium is stable; for any displacement makes the weight rise, and its tendency is to descend, and restore the former state. Now reverse the direction of the weight, and let the string communicate thrust, instead of pull, as before described. Then there is still equilibrium (which is demonstrable independently) because only the directions of the forces are changed: but since the forces change direction, the virtual velocities change sign, and $Pl.\alpha+$, &c. is always positive, and of the second order. Here then, though the weight (we call $\frac{1}{2}$P *weight* always, whether it tend upwards or downwards) tends to rise, and (geometrically speaking) can rise, it does not rise: observe also that the rise would be an infinitely small quantity of the second order. The equilibrium in this case is unstable, for every displacement raises the weight, which does not tend to return. Now let the weight $\frac{1}{2}$P act *upwards*, and let it push in all the string possible, and then rest. There must then be equilibrium, for every displacement makes the weight fall, and the weight has no tendency to take advantage of this power of falling. Consequently there must be equilibrium when $2la+$ &c. is a maximum, the weight acting upwards; that is, when $2lda+$ &c. is always negative, and of the second order; or when $Pl.\alpha+$ &c. is always negative,* and of the second order: and this equilibrium is stable, for any displacement makes the weight fall, and its tendency is to rise and restore the former state. Now reverse the direction of the weight, and let the string pull, instead of thrust. There is still equilibrium (because only the directions of the forces are changed): the virtual velocities change sign, and $Pl.a+$, &c. is always positive, and of the second order; and in this last case, though the weight tends to fall, and (geometrically speaking) can fall, it does not fall: observe also that the fall would be an infinitely small quantity of the second order; and the equilibrium in this case is unstable, for every displacement lowers the weight, which does not tend to return.

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* Lagrange avoids this second case by an appeal to mathematics, which not nly destroys the elementary character of the proof, but is of a character inongruous with the other parts of it, and is moreover not always correct.

* When the action of the string is that of a thrust, it will be seen that da is $=\alpha$, &c., since the virtual velocities change sign.

Collecting these cases, it appears then that whenever $Pl.a+$ &c. is, for every infinitely small displacement, an infinitely small quantity of one given sign, there is equilibrium; stable when that sign is negative, unstable when it is positive. But supposing $Pl.a+$, &c. to be of the second order, sometimes of one sign, and sometimes of the other, according to the displacement, the preceding reasoning does not apply. Nor do we see how it can be applied without the assumption that an equilibrium, which is produced when all the displacements of the weight favour the motion which it tends to take, is *à fortiori* produced when some only do the same. Taking the case in which the weight acts downwards, we have seen that there is equilibrium when the descent of the weight is of the second order, and *always* downwards: the circumstance of the descent being of the second order produces equilibrium, even though its direction is that which the weight can take. Still more must there be equilibrium when all the descents are of the second order at least, and some only downwards; and the more so because in this case, as the mathematician knows, the descents are really of the third order, that is, infinitely small compared with those of the second order.

Hence, in every case, $Pl.a+$, &c. $= 0$ (in the common language of the differential calculus) gives a position of equilibrium; and we have now to prove the converse, namely, that every position of equilibrium gives $Pl.a+$, &c. $= 0$ (Lagrange proves this converse first). This converse can be proved, we submit, without taking it for granted at once, with Lagrange, that if any motion of ¼P, of the first order were possible, the weight would, by its tendency to descend, take that motion.*

Supposing the system to be at rest, and the weight to act downwards, it is obviously physically possible that a given finite velocity should be communicated to the weight. Suppose a blow to be given to the weight in a downward direction, such as would communicate a finite velocity. What would be the effect upon the system at the instant when the weight receives the blow downwards? An impulsive strain upon the string, which would only communicate forces proportional to those already existing,† and could not disturb the equilibrium. The system then cannot move, neither therefore can the weight move. Now as it is unquestionably physically possible that the weight may take a finite velocity, the impossibility of moving the system must be geometrical; or a velocity communicated to the system must, be it what it may, at the first instant, communicate none to the weight; and the definition of velocity shows that this can only happen when, the displacements of the system in the time dt bearing a finite ratio to dt, that of the weight is infinitely small compared with dt; that is, when the displacement of the weight is infinitely small compared with those of the system. From this it follows that $2la+$ &c. is infinitely small as compared with a, &c.

We do not know how to make the preceding prove its converse, and we object to the mode pursued by Lagrange. Having proved that equilibrium gives $2la+$ &c., that is, having proved it on the distinct assumption that the weight cannot descend in the first instant through a quantity comparable to a, &c., he then proceeds as follows:—Reciprocally $2la+$ &c. $= 0$ gives a case of equilibrium; for 'the weight remaining immoveable under all displacements, the powers which act upon the system remain in the same state, and there is no more reason why they should produce one of the two displacements than the other, of any two in which a, &c. have contrary signs. It is the case of the balance which remains in equilibrium, because there is no more reason why it should incline on one side than the other.' Now, first, this reasoning might just as well be applied to prove equilibrium when $2la+$ &c. is *not* $= 0$; secondly, it is not the case of the balanced lever of Archimedes, for there is not that same symmetry, either geometrical or mechanical, which makes it impossible to admit either motion in preference to the other [STATICS; SUFFICIENT REASON]; thirdly, there is a mechanical reason why the one of the motions should be taken rather than the other, namely, that one in which the displacement of the weight (even though supposed of the second order) is positive. This last will appear sufficiently in the sequel.

We shall now proceed to show that the moment the principle of virtual velocities is granted, a problem of statics becomes one of pure mathematics. This is all we can undertake to illustrate; and for this purpose any mathematical result may be taken for granted. First, let the force P be decomposed into three, X, Y, Z, in the directions of x, y, and z; and let the point of application move until the coordinates are $x+dx$, $y+dy$, $z+dz$. Then a force equal and opposite to P (of which the moment is $-Pdp$) balances X, Y, and Z; so that the principle gives $Xdx+Ydy+Zdz+(-Pdp)=0$, or $Pdp=Xdx+Ydy+Zdz$. Do the same with each of the forces, and we have $\Sigma(Pdp)=\Sigma(Xdx)+\Sigma(Ydy)+\Sigma(Zdz)$. If the system be rigid, every virtual motion may be decomposed into two: a motion of translation of any one given point, and a motion of rotation round an axis passing through that point. Let x_0, y_0, z_0 be the coordinates of any point which moves with the system, and let this point move so that its coordinates shall become x_0+dx_0, y_0+dy_0, z_0+dz_0, at the same time that the system revolves through an angle $d\phi$ about an axis passing through the point (x_0, y_0, z_0), and making angles λ, μ, ν with the three axes. If the consequence of this motion be that the point whose coordinates are x, y, z moves so that its coordinates become $x+dx$, $y+dy$, $z+dz$, we have

$$
\begin{aligned}
dx&=dx_0+\{\cos\mu\,(z-z_0)-\cos\nu\,(y-y_0)\}\,d\phi\\
dy&=dy_0+\{\cos\nu\,(x-x_0)-\cos\lambda\,(z-z_0)\}\,d\phi\\
dz&=dz_0+\{\cos\lambda\,(y-y_0)-\cos\mu\,(x-x_0)\}\,d\phi
\end{aligned}
$$

from which we find for

$$\Sigma(Pdp) \text{ or } \Sigma(Xdx)+\Sigma(Ydy)+\Sigma(Zdz),$$

the following expression:—

$$
\begin{aligned}
&\Sigma X.dx_0+(z_0\Sigma Y-y_0\Sigma Z)\cos\lambda\,d\phi+\Sigma(Zy-Yz).\cos\lambda\,d\phi\\
&+\Sigma Y.dy_0+(x_0\Sigma Z-z_0\Sigma X)\cos\mu\,d\phi+\Sigma(Xz-Zx).\cos\mu\,d\phi\\
&+\Sigma Z.dz_0+(y_0\Sigma X-x_0\Sigma Y)\cos\nu\,d\phi+\Sigma(Yx-Xy).\cos\nu\,d\phi
\end{aligned}
$$

and in the case of equilibrium this is always $= 0$. Since dx_0, dy_0, dz_0, $\cos\lambda d\phi$, $\cos\mu d\phi$, $\cos\nu d\phi$, can each receive any value we please independently of the rest, the preceding can only vanish when the six following conditions are fulfilled:—

$$
\begin{array}{lll}
\Sigma X=0 & \Sigma Y=0 & \Sigma Z=0\\
\Sigma(Zy-Yz)=0 & \Sigma(Xz-Zx)=0 & \Sigma(Yx-Xy)=0
\end{array}
$$

which are the six well-known equations of equilibrium of a rigid system.

We might give more examples, but our limits require us at once to enter upon a point which will require fuller explanation, because the student will not find it in any elementary work. 'When $\Sigma(Pdp)$ is $= 0$ for every virtual motion, there must be equilibrium:' but the converse, namely, that 'when there is equilibrium the equation $\Sigma(Pdp)=0$ must be true for every virtual motion,' has not the same universality as the direct proposition. If we look carefully at the proof, we shall see that, taking any particular instance of virtual motion, the only reason why we want $\Sigma(Pdp)$ to be $= 0$ for that particular motion is that the forces may not be able to make the system set off with that motion: or that the incapability might exist even though that motion were the only one which the system could take. If then there be in the nature of the system itself any reason why a particular case of virtual motion should be unattainable by the action of those forces, we have no longer any reason to say that $\Sigma(Pdp)$ must be $= 0$ in that case.

As a general rule, if P, Q, R, &c. be the acting forces, and $Pdp+Qdq+Rdr+$ &c., the sum of their moments, and if in one virtual motion $dp=a$, $dq=\beta$, $dr=\gamma$, &c., that one virtual motion has its opposite, in which $dp=-a$, $dq=-\beta$, $dr=-\gamma$, &c. And we shall presently see that if that one motion and its opposite be by proper restrictions made the only ones which the system can take, the system will begin to take the first motion if $P\alpha+Q\beta+R\gamma+$ &c. be positive, and the opposite if $P(-\alpha)+Q(-\beta)+R(-\lambda)+$ &c. be positive. In fact, a system must set off from rest in such manner that the sum of the initial moments is positive: and it is clear enough that either $P\alpha+$ &c., or $P(-\alpha)+$ &c. must be positive unless both vanish. As a general rule then, $P\alpha+$ &c. must vanish; for if not, either the virtual motion first named, or its opposite, has a positive sum of moments, and can be, and (if no other motion can take place) will be, an initial motion of the system. But if ever it should happen that there are cases in which a virtual motion is possible, but its opposite motion is impossible, then all that is requisite is that for the possible one of the pair, $\Sigma P dp$ should be 0 or negative, *not positive*. There is another exception of a remarkable character, for which it will be better to wait until we come to see the meaning of the sum of the moments in a dynamical point of view. Excluding this for the present, let a virtual motion which has its opposite be called a double motion, and one which has not its opposite, a single motion: then the true statement of the principle of virtual velocities is as follows:—

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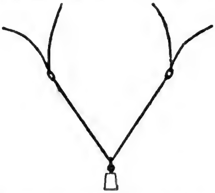
* It seems to us just as sound to say that if there be any motion of the second order possible, the weight will take that motion, and in an infinitely small time acquire a velocity of the first order, which is exactly what takes place in a body falling freely from rest.

† It is here assumed that whatever forces keep a system at rest, impulses proportional to those forces, and applied in the same manner, will not disturb the equilibrium.

If $\Sigma P dp$ be nothing for every double virtual motion, and nothing or negative for every single one, there is equilibrium: and if there be equilibrium, then $\Sigma(P dp)$ is nothing for every double virtual motion, and nothing or negative for every single one.

We might easily have incorporated the consideration of these exceptional cases of single virtual motions in the general proof. We shall now give a simple instance. Let a weight be fastened to the middle of a string, at the end of which are two rings; these rings slide upon curves which have cusps as in the diagram. The weight is in equilibrium, and the weight is the only external acting force: but its moment is not nothing (that is, is not of the second order with reference to the displacement of the rings), but is negative. The virtual motions of the rings are single, and can only be upwards. The reader who compares the preceding omission in the statement of the principle of virtual velocities with Variations, Calculus of, p. 141, will see a remarkable likeness between the cases: in fact, these errors and several others depend upon the same sort of omission, which may be stated as follows:—If there be a proposition (A) which is true on condition that the quantity B is never positive; and if, generally speaking, every negative value of B be accompanied by a corresponding positive one, then, generally speaking, (A) cannot be true if B be negative: that is, the truth of (A) requires $B=0$. But if there be exceptional or singular cases in which negative values of B are *not* accompanied by corresponding positive ones, then $B=0$ is no longer necessary; it is enough that B should be negative. Now the error which has run through the results of the differential calculus from book to book, from country to country, and from century to century, consists in taking the usual and general case for universal, and forgetting the exception.



The principle of virtual velocities is applied to dynamics by means of the celebrated principle which goes by the name of D'Alembert, propounded by him in his treatise on dynamics, published in 1743. We have touched upon this principle in Forces, Impressed and Effective, but we have referred the complete development of it to the present article.

It will do for our present purpose to suppose a system of points connected together, each point being considered as a certain mass of matter. Whatever may be the faults of the system of Cavalieri for geometrical deduction, it is sound enough, mechanically considered: a point may not be taken to be one of the constituent parts of a length, but there is no difficulty in considering it as endowed with weight and impenetrability, or as rigidly connected with other points. If we imagine a mass of matter to be divided into an infinite number of infinitely small elements, each of which is an extended mass, though we may not, for geometrical purposes, suppose each of these elements to have its bulk collected in any one of its points, there is no difficulty in supposing its mass to be so collected. If then we begin with the consideration of a finite number of points, having various masses, we may, by increasing the number of our points and diminishing their masses, approach as near as we please to the case of a continuous geometrical solid, all the parts of which have weight, and of which the density varies according to any law. Again, when a system moves, and when the law of its motion is known, we can determine, at any one instant [Velocity, p. 196], the velocity of any one point in any one direction, and the acceleration (or retardation, *negative* acceleration) at that one instant: that is to say, the rate per second at which the motion is receiving acceleration at the moment named. From this acceleration, as in the place last cited, we can determine the pressure which the mass of the point in question is actually experiencing at the moment; for on one mass there is but one pressure which can produce acceleration at one given rate. In this way then we can determine the pressures which the various points (or molecules[*]) of the system are undergoing; and this determination is made *in terms of the motion*, that is, in terms of the velocities and accelerations of the molecules, the pressures being derived from the accelerations by reference to the known masses of the molecules. The pressures so obtained are called *effective forces*, a sufficient and expressive name. But it by no means follows that the forces *applied* at the different molecules are those which are *effective* on those molecules. Two molecules are inseparably joined by a rigid bar without weight, and thrown into vacuous space. If these molecules were thrown separately, each would describe a parabola; but as the case stands, the centre of gravity of the molecules describes a parabola, and the bar revolves round its centre of gravity [Translation and Rotation]: the effective forces are very different from the impressed forces. Now D'Alembert's principle is the expression of this simple law, that *force is never lost nor gained*:[†] if a force applied to any molecule of the system be not wholly effective on that molecule, the part which is not effective on the molecule of application is effective elsewhere; and if the motion gained by, or rate of acceleration shown by, any given molecule, be greater than due to the force impressed on that molecule, some other molecule of the system must have less than is due to its impressed force. Thus the motion of a system of connected molecules involves a collection of debtor and creditor accounts, the balances of which cannot show, when put together, the smallest amount of momentum in any direction, except what the system either had at the beginning or has received from the impressed forces during the motion. The consideration of the third law of motion [Motion, Laws of, p. 453] would make such a result appear extremely probable, if not necessary; but a specific demonstration of the truth of the principle can be given.

Let the molecules have the masses m_1, m_2, &c., and let the impressed forces be such as, in their directions, would give the rates of acceleration P_1, P_2, &c., if these molecules were free and unconnected. Then [Force; Mass; Variation, p. 137; Velocity, p. 195] m_1P_1, m_2P_2, represent the pressures impressed, on the condition that the unit of pressure is that which produces a unit of acceleration in the unit of mass. Let the effective pressures, derived from the velocities in the directions of the coordinates of x, y, and z, and compounded into one force for each molecule, be such as would produce the rates of acceleration Q_1, Q_2, &c.; so that the effective pressures are m_1Q_1, m_2Q_2, &c. When two forces act on a point, either is equivalent to the other with a certain third force; let m_1P_1 be equivalent to m_1Q_1 and m_1R_1; let m_2P_2 be equivalent to m_2Q_2 and m_2R_2.

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[*] A molecule, in geometrical mechanics, means a point endowed with the properties of a mass of matter, finite or infinitely small, as the case may be.

[†] We here exclude friction and resistances, but only on account of our ignorance of the action of these forces. The forces lost (that is, lost with respect to the system) are here communicated to other substances, to the mass in contact or to the air.

and so on. Then the system (P) of impressed forces is equivalent to the system (Q) of effective forces, together with the system (R): for (P) substitute (Q) and (R), and the effect upon the system, in the infinitely small time following the moment of which we speak, is what it would have been if (P) had continued. But that effect is precisely what is produced by (Q); for (Q) was nothing but the pressures necessary to produce the actual effect of which we are speaking. Therefore (R) has no effect, and would of itself equilibrate the system: to suppose that (R) would not equilibrate, or would produce some motion, while (Q) is actually calculated to produce all that is to take place, is to suppose that the system will, in the infinitely small time next ensuing, have another motion besides that which (Q) would produce, which is absurd. Consequently (R) is a system of equilibrating forces, which is expressed by saying that the forces lost and gained balance one another: for if m_1P_1, the force impressed on m_1, be equivalent to m_1Q_1 and m_1R_1, of which m_1Q_1 is enough to produce what takes place, it is obvious that m_1R_1, so far as the molecule m_1 is concerned, is lost. It would be better to say that m_1R_1 is transferred, and that all the forces transferred balance one another. Again, since (R) is wholly without effect, it follows that (P) is equivalent to (Q); or, at every instant of the motion, the impressed forces are a set of equivalent statical powers with the effective forces: so that if either set were applied to the system at rest, and also the opposites of all the forces in the other set, there would be equilibrium. Or the impressed forces balance the effective forces with their signs changed. Now the effective forces on m_1, in the directions of x, y, and z, are $m_1\frac{d^2x_1}{dt^2}$, $m\frac{d^2y_1}{dt^2}$, $m_1\frac{d^2z_1}{dt^2}$, and similarly for the rest; while, if we decompose the rate of acceleration P_1 into X_1, Y_1, Z_1, in the directions of x, y, and z, the impressed pressures in these directions are m_1X_1, m_1Y_1, and m_1Z_1. And [VARIATIONS, CALCULUS OF, p. 140] to distinguish the virtual motion which the problem of equilibrium requires, from the actually coming motion in terms of which the effective forces are expressed, we may use δx, instead of dx, in the former, and so on. Hence, changing the signs of the impressed forces and combining them, so changed, with the effective forces, we have, for the fundamental equation of every dynamical problem—

$$\Sigma\left(\frac{d^2x}{dt^2}-X\right)m\delta x+\Sigma\left(\frac{d^2y}{dt^2}-Y\right)m\delta y+$$
$$\Sigma\left(\frac{d^2z}{dt^2}-Z\right)m\delta z=0.$$

From which are obtained, as in a preceding process, the following six equations of motion, abbreviating $d^2x:dt^2$ into x'', and so on—

$$\Sigma(mx'')=\Sigma(mX) \qquad \Sigma\{m(z''y-y''z)\}=\Sigma\{m(Zy-Yz)\}$$
$$\Sigma(my'')=\Sigma(mY) \qquad \Sigma\{m(x''z-z''x)\}=\Sigma\{m(Xz-Zx)\}$$
$$\Sigma(mz'')=\Sigma(mZ) \qquad \Sigma\{m(y''x-x''y)\}=\Sigma\{m(Yx-Xy)\}$$

These equations express the property already mentioned [TRANSLATION], namely, that the centre of gravity moves as it would do if all the masses were collected there, and all the pressures applied there. We shall merely enumerate the steps of the proof of this proposition. The coordinates of the centre of gravity being x_0, y_0, z_0, we have $x_0\Sigma m=\Sigma(mx)$, &c., whence $x_0''\Sigma m=\Sigma(mx'')=\Sigma(mX)$, &c., which are precisely the equations for the motion of a molecule of the mass Σm, and to which the force $\Sigma(mX)$ is applied. With regard to the initial velocity which ought to be given to the centre of gravity, when the molecules are there collected, observe that $x_0'=\Sigma(mx')\div\Sigma m=\{A+\Sigma(\int mXdt)\}\div\Sigma m$, where A is the initial value of $\Sigma(mx')$. Consequently, at the commencement of the motion x_0' should have the same value as $\Sigma(mx')\div\Sigma m)$, or we should have $x_0'\Sigma m=\Sigma(mx')$ at the outset; that is, the momentum of the collected mass, in the direction of x, should be the same as the sum of the momenta of the molecules in the system, and the same of the other coordinates. Again, let ξ, η, ζ, be the coordinates, referred to the centre of gravity, of the point whose original coordinates are x, y, z.

We have then $x=x_0+\xi$, $y=y_0+\eta$, $z=z_0+\zeta$; also $\Sigma.m\xi=0$, $\Sigma m\eta=0$, $\Sigma m\zeta=0$. Substitution gives

$$\Sigma\{m(z''y-y''z)\}=y_0\Sigma mZ-z_0\Sigma mY+\Sigma\{m(\zeta''\eta-\eta''\zeta)\}$$
$$=\Sigma\{mZ(y_0+\eta)-mY(z_0+\zeta)\}$$

whence $\Sigma\{m(\zeta''\eta-\eta''\zeta)\}=\Sigma\{m(Z\eta-Y\zeta)\}$

which, with the two other equations similarly deduced, are precisely those which would determine the motion if the centre of gravity were fixed and the forces then applied. We must refer to works on the subject for further development of these conditions, and shall proceed to cases more illustrative of the principle under consideration.

Among the virtual motions, one of course is the motion the system is actually about to take. In this case δx is dx, &c., and the fundamental equation becomes

$$\Sigma\{m(x''dx+y''dy+z''dz)\}=\Sigma\{m(Xdx+Ydy+Zdz)\}$$

Now the first side of this equation is nothing but the differential with respect to the time of $\frac{1}{2}\Sigma\{m(x'^2+y'^2+z'^2)\}$, or $\frac{1}{2}\Sigma mv^2$, v_1, v_2, &c. being the actual velocities of the molecules at the end of the time t. Hence we have

$$\Sigma mv^2=A+\Sigma\{m\int(Xdx+Ydy+Zdz)\}$$

where A is the value of Σmv^2 at the commencement of the motion, and the integral also begins at that commencement. Suppose the system to be at rest at the commencement of the motion, then $A=0$, since each of the initial velocities is nothing; consequently at the end of the first infinitely small element dt, Σmv^2 has changed from 0 to $\Sigma m(Xdx+Ydy+Zdz)$. But this is precisely the sum of the moments of the impressed forces in the principle of virtual velocities; and Σmv^2 being $m_1v_1^2+m_2v_2^2+$&c. must be a positive quantity. Hence the sum of the moments must be positive, for the virtual motion which the system actually tends to take: and this is the principle of which we have forestalled the use in completing the correct enunciation of the principal of virtual velocities. This might be suspected beforehand from the following consideration:—The forces which have positive moments are those which tend, so far as they go, to produce the virtual motion in question; and those which have negative moments to hinder it. Whatever motion the system takes must be one in which the forces tending to produce that motion predominate over those which tend to hinder it; or the forces with positive moments must have those moments together larger than the forces with negative moments.

The choice which the system* makes among all the virtual motions, in which to begin its motion, is that in which the sum of all the moments of the forces is a maximum, in the sense which will presently be explained. Since every motion of a system can be reduced to a translation of the centre of gravity and rotation round an axis passing through that centre, let us reduce the virtual motion to terms of the motion of and round the centre of gravity. If ΣmX, &c. be P, Q, R, and if $\Sigma\{m(Zy-Yz)\}$, &c. be L, M, N, it follows from what has been shown respecting the motion of this centre that its first direction of translation (the system starting from rest) is such that dx_0, dy_0, dz_0 are in the proportion of P, Q, R, and that the axis round which the system begins to turn makes angles with the axes of x, y, and z, whose cosines are in the proportion of L, M, and N. Now suppose any motion of and round the centre of gravity, and returning to the expressions in which the sum of the moments is given in terms of those motions, observe that we must write mX for X, &c., because the pressures are now represented by mX, &c. which were then represented by X, &c. Moreover $z_0\Sigma mY-y_0\Sigma mZ$, and the other terms corresponding, all vanish, because $z_0=\Sigma mZ\div\Sigma m$, &c. We have then for the sum of the moments,

$$Pdx_0+Qdy_0+Rdz_0+(L\cos\lambda+M\cos\mu+N\cos\nu)\,d\phi.$$

Let the displacement of the centre of gravity be du, we have then $du=\sqrt{(dx_0^2+dy_0^2+dz_0^2)}$. Now the theorem is that for given values of du and $d\phi$, for a given amount of translation and rotation, the direction of translation and the position of the axis of rotation, in the virtual motion which the initial effect of the forces actually causes, are such as to make the preceding expression a maximum.

First, it must be shown by the common methods that for a constant value of $p^2+q^2+r^2$, the expression $Ap+Bq+Cr$, *if then positive*, is a maximum when p, q, r are in the proportion of A, B, C. Now in the actual motion of the system, $Pdx_0+Qdy_0+Rdz_0$, and $(L\cos\lambda+$ &c.$)\,d\phi$ *are positive quantities:* for the first is the initially obtained value of $\frac{1}{2}\Sigma mv^2$ when the system is all collected at the centre of gravity and all the forces are there applied nd the second is the same when the centre of gravity is ixed and the system begins to move about it. And since he variables of the first and second are entirely indeendent of each other, the sum of the two is a maximum vhen each separately is a maximum. In the first, $dx_0^2 +$ ‹c. is a constant, being du^2, and therefore the first is a aximum when dx_0, dy_0, and dz_0 are in the proportion of ', Q, R. But in the second, $\cos^2\lambda + \cos^2\mu + \cos^2\nu = 1$, vhence the second is a maximum when $\cos\lambda$, $\cos\mu$, $\cos\nu$ re in the proportion of L, M, N. But these two sets of onditions put together precisely represent the motion vhich at the outset the system does take from the impressed orces. Whence the theorem is true, as asserted.

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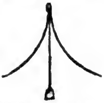
* We confine ourselves here to a rigid system, though the proposition is true universally. But the universal proof would be too long.

We may now treat the exception of which we have poken in a preceding part of this article. Suppose that he moments in all the directions in which the system can iove are equal, or else that there is among them a set hich are equal, and each of them greater than any of the est. Which of all the virtual motions having these moients is the system to take? It cannot prefer either, and ill remain in equilibrium. As an instance, let the end of string be attached to a curve on which it can slide freely, while the string supports a weight. Let the curve have a cusp pointing upwards, with its tangent vertical, and let the end of the string be placed at the cusp, as in the diagram. There will be equilibrium, but the principle of virtual velocities will not be true, even in the extended form which we ave used. The moments belonging to the two possible iotions are positive, but they are equal. On which side s the descent to take place?



The mathematician has a warning in such cases, which nay be easily and briefly expressed. The expression ΣPdp, before it is used, requires that the quantities p_1, p_2, ‹c. should be reduced to the smallest number of indeendent variables. Let $q_1, q_2 \ldots$ be these variables, and let he sum of the moments, when reduced to terms of these ariables, be $Q_1dq_1 +$ &c., or ΣQdq. The principle is hen intelligible when, for all the virtual motions, dp_1, dq_1, ‹c. have finite ratios to one another. But if there be any osition in which for a certain virtual motion one or more f the set dp_1, dp_2, &c. become infinite with respect to hose of the set dq_1, dq_2, &c., the equation becomes inapable of being used. For if we take the actual virtual *elocities*, and attempt to reduce

$$\Sigma Q\frac{dq}{dt} \text{ to its equivalent } \Sigma P\frac{dp}{dt},$$

he first side, which may be made finite, is equated to an xpression in which infinite terms occur, which is always warning to expect the possibility of cases of exception. ircumstances of this sort have never received investigaon, and in all probability there are numerous varieties of ie cases of equilibrium which arise out of them, and hich cannot be treated by the ordinary principle. So nuch we may certainly say, that if there be different irtual motions with the sums of the moments positive and naxima, either there must be equilibrium, or the test for letermining which of the motions will ensue is wholly nknown.

On the history* of virtual velocities, there is not much o say. Guido Ubaldi saw it in some cases, Galileo in ome others; Wallis adopted it as a principle, and after im John Bernoulli, who gave it in the most general orm. Lagrange made it the foundation of his 'Mécanique Analytique,' and since his time it has formed part of every well-constituted treatise on mechanics. It was in the 'Mécanique Analytique' that the principle given by D'Alembert was first joined to that of virtual velocities in such a manner as to give the science of dynamics its present uniformity of system.

VIS VIVA, or *living force*, a name given in mechanics to the following index of the state of a system in motion:—the sum of all the masses, each multiplied by the square of its velocity. If the system be considered as composed of a finite number of molecules, the vis viva may be expressed by the symbol Σmv^2; but if it be a continuous mass, or a collection of continuous masses, by $\int v^2dm$, or $\Sigma \int v^2dm$. It is enough that the mass of every particle be found in the expression, multiplied by the square of its velocity.

In the article VIRTUAL VELOCITIES we see the equation—

$$\Sigma mv^2 = \Sigma m \int (Xdx + Ydy + Zdz),$$

the integral being taken for each molecule over the whole path which it has described since the beginning of the motion.

Presuming a knowledge of the article cited, we may describe the vis viva thus: Dividing the whole motion of the system, from the beginning to the time under consideration, into an infinite number of infinitely small changes of place, each of those changes is one of the virtual motions which comes under consideration in the principle of virtual velocities. And each motion has, generally speaking, its contrary; and one of these two the system would tend to take, and to refuse the other, if its motion were for an instant restricted, so that it could only choose between those two. The one which it would tend to take is that for which $\Sigma m\,(Xdx +$ &c.) is positive. Now it appears in the preceding equation that whenever the infinitely small motion which is taking place for the time being is that which (when restricted as above) the system would take, the vis viva is receiving increase; when that which it could not take, decrease. And the vis viva is the balance, so to speak, of all the sums of moments, each with its proper sign, added, also with its proper sign, to the vis viva at the beginning of the motion.

The preceding equation is sometimes said to express the principle of the *conservation of vis viva*, which is to be understood thus: the system never acquires nor loses any quantity of vis viva from the action of its parts upon each other, but only from the action of external forces. If after a certain time all external forces cease, from that moment $\Sigma m\,(Xdx +$ &c.) is $= 0$, or $d\,(\Sigma mv^2) = 0$, or Σmv^2 remains constant.

Another remarkable property of the vis viva is that, in all the cases which occur in nature, the amount of vis viva acquired in passing from one position to another depends only on the coordinates which settle the initial and final positions. If X &c. be functions of coordinates only, it generally happens that $Xdx + Ydy + Zdz$ is an integrable function, and depends on coordinates only. But the force of this result is not easily seen by the beginner.

At the end of the seventeenth century a remarkable discussion took place on the question of the mechanical interpretation of the vis viva. Leibnitz first gave this name: he considered force when it produces motion as *vis viva*, or living force; but when it is equilibrated, he called it *vis mortua*, or dead force; and he measured the effect of living force by the mass multiplied into the square of the velocity. To take the simple case which was mostly appealed to:—If two equal weights be thrown up in vacuo, the one with a velocity double of that of the other, it is well known that the one will rise, not *twice*, but *four* times as high as the other; accordingly Leibnitz considered that the force which produces the double velocity is four times as effective as the other force. Various other instances were produced in which the duplication of the velocity is the quadruplication of the effect produced. It was accordingly argued that, for a given mass, the square of the velocity is the proper measure of the force necessary to destroy or to create the velocity. But, on the other hand, it was very well known that, whatever might be adopted as the measure of force, it was certain that pressures were, *cæteris paribus*, proportional to the simple velocities produced by them in a given time. John Bernoulli adopted the opinion of Leibnitz, which was opposed by various other contemporaries; and the controversy (the history of which may be seen in Montucla) continued until the publication of D'Alembert's work on dynamics, in which the question was treated as being purely one of words.

It was objected to the opinion of Leibnitz, that though the double velocity would give four times the ascent, it ought not to be forgotten that it required twice the time: so that in a given time double the velocity would produce only double the ascent, one part of the ascent with another. This argument was never satisfactorily answered; and while we cannot help thinking that it ought to have been decisive of the question, we draw from it a conclusion different from that of D'Alembert; we cannot think the dispute a mere question of words. It must be granted that, for all purposes in which time is not an element, the measure of the effect of a force may be the square of the velocity; as exemplified in the instance cited. But when is it that a mechanical effect can be properly estimated without reference to the time in which it is produced? The definition of the words measure and effect may thus without doubt be accommodated either to the idea of Leibnitz or of his opponents; and those who disputed on the question without requiring exact definitions might degenerate into a mere question of words. But it ought to have been a question as to what was the *proper* meaning of the word effect, in the fundamental phase 'effect of a force,' the proper explanation of which must precede all good reasoning in mechanics. If pressure be defined as that which produces a certain effect [PRESSURE] on our senses, undoubtedly it is a known fact that uncounteracted pressure produces motion; but it is only when allowed to act for a finite time: consequently the element of time is as essential to the conception of the phenomenon as that of pressure or motion. Height in a rectangle gives area, but it would not therefore be allowable to measure that area by the height; for there must be a base, or there is no rectangle at all. But if pressure be merely considered as the cause of motion, and called force in that sense, it is very difficult to see why the cause, which is only known by the effect, is to be measured by anything but the simple effect. Probably this discussion gave rise to the chapter of the 'Mécanique Céleste' in which Laplace speculates upon what the laws of motion would have been if force had been as a function of the velocity, instead of as the simple velocity. We have never met with any one who could give us an intelligible account of the meaning of this investigation.

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* On this point, and many others connected with the history of mechanics, the reader will find specific accounts and valuable references in Walton's 'Collection of Problems on Theoretical Mechanics,' Cambridge, 1842.

VISCHER, PETER, a celebrated old German sculptor and founder, born about the middle of the fifteenth century. He lived several years in Italy, where he studied his art. He first distinguished himself in Germany by his monument to the Archbishop Ernest of Magdeburg, erected in the cathedral of that place in 1497. But his master-piece is the tomb of St. Sebald, in the church of that saint at Nürnberg, where Vischer ultimately settled. Vischer, with his five sons, Peter, Hermann, Hans, Paul, and Jacob, who with their wives and children lived in the same house with him, was occupied over this monument from 1506 until 1519, yet he was paid only 2402 florins, which is at the rate of 20 florins per cwt.: the whole monument weighed 120 cwt. 14 lbs. It is beautifully designed and richly ornamented: among other figures there are twelve small statues, eighteen inches high, of the apostles, which are remarkably well drawn, and all conspicuous for their fine expression. In one part he has introduced his own portrait in his working dress. It is a monument, upon the whole, worthy of any time and any nation. Vischer executed some other clever works at Nürnberg: he died, according to Doppelmayr, in 1530.

Hermann Vischer studied likewise in Italy, and was scarcely inferior to his father; he was killed in 1540 by a sledge, as he was going home one night with a friend. Sandrart says that no prince or gentleman that visited Nürnberg left it without having seen and conversed with Vischer. He received many orders during these visits, and he sent many works into Bohemia, Poland, and other neighbouring countries.

(Sandrart, *Teutsche Academie*, &c.; Doppelmayr, *Nürnbergische Künstler*, &c.)

VISCHER, CORNE'LIUS, a celebrated Dutch engraver, born, probably at Haarlem, in 1610. He was the pupil of P. Soutman, but he soon surpassed his master. Vischer's works are among the finest specimens of art executed by the graver; Basan says that no master can be studied by young engravers with more advantage. He engraved prints of many descriptions, and some of his best are after his own designs. Watelet says that no man ever painted with the graver and the etching-needle together with such effect as Vischer. Strutt, speaking of his style of working with the graver, says, 'His mode of performance with that instrument was as singular as the effect he produced was picturesque and beautiful. His strokes are clear and delicate, laid over the draperies and the background apparently just as the plate happened to lie before him, without any care or study which way they should turn, the one upon the other; and he crossed and recrossed them, till such time as they produced sufficient colour.'

The few following are of the rarest and most valuable of his prints; good impressions of some of them have been sold for from fifteen to twenty pounds:—

Andreas Deonyszoon Winius, commonly called the Man with the Pistols; Gellius de Bourna, minister of Zutphen; a Cat sleeping upon a napkin; the Rat-catcher; the Pancake-woman; and the Gipsy. Mariette possessed a collection of 172 of Vischer's prints, which was sold for [illegible] francs 12 sous. His portraits are the best of the pieces which he engraved after other masters. The year of his death is not known, but it was probably about 1660.

Cornelius's brother Johan Vischer was likewise a good engraver and etcher, but, except in landscapes, inferior to his brother. He executed some good plates after Berghem and Ostade. He was born at Amsterdam in 1636: he died 1692, in his fifty-sixth year, says Houbraken, he was an animal-painter. He worked likewise with the needle and the graver, but more with the needle.

Lambert Vischer was also a brother of Cornelius, but of inferior merit. He lived some time in Rome.

There was also a Nicolaus or Claus Johan Visscher, engraver and printseller, born at Amsterdam in [illegible], who was probably of the same family. He excelled in small landscapes with figures; but he engraved also portraits: he engraved one of Charles I. of England; and published portraits of Archbishop Laud, Calvin, Erasmus, James II. of England, and the duke of Monmouth.

(Houbraken, *Groote Schouburgh*, &c.; Basan, *Dictionnaire des Graveurs*; Strutt, *Dictionary of Engravers*; Huber and Rost, *Handbuch für Kunstliebhaber*, &c.

VISCO'NTI, the name of a family in Lombardy who rose to the rank of sovereign princes during the middle ages. The Visconti begin to figure in history about the middle of the thirteenth century. They belonged to the feudal nobility, and were possessed of considerable estates in the northern part of Lombardy, near the banks of the lake of Como and of the Lago Maggiore. In 1262 the archdeacon Ottone Visconti was nominated archbishop of Milan by Pope Urban IV. The see of Milan had been vacant ever since the death of Leone da Perego, in 1257, because the chapter was divided into two parties, one of which favoured a candidate from among the nobility, and the other gave its votes to a relative of Martino della Torre, the popular leader, who had been appointed 'anziano,' or 'elder,' of the people of Milan. The appointment of Ottone Visconti by the pope was considered an encroachment on the rights of the electors; and Martino della Torre sequestrated the property of the see, and forbade the archbishop elect from appearing in Milan. Upon this the pope excommunicated the city of Milan. But Martino della Torre and his successors Filippo and Napoleone della Torre continued to enjoy the popular favour, and Ottone Visconti remained an emigrant for fifteen years, during which he carried on, at the head of his feudal dependants, joined by malcontents from Milan and other towns, a desultory and predatory warfare against the Milanese. At last the popular feeling turned against Napoleone della Torre, who was suspected of aspiring to the sovereign power, especially after he had asked and obtained from Rudolf of Habsburg, the newly elected king of Germany, the dignity of imperial vicar. Ottone Visconti seized this opportunity for striking a decisive blow. He put himself at the head of a large body of emigrant nobles and advanced towards Milan. Napoleone della Torre and his adherents went out to meet him, and a combat ensued in January, 1277, near the village of Desio, in which the Torriani, as the partisans of Della Torre were called, were defeated with great slaughter, and Napoleone was taken prisoner. Ottone Visconti entered Milan amidst the acclamations of the people, who saluted him as archbishop and perpetual lord of Milan. [LOMBARDY AND LOMBARD CITIES.]

The Archbishop Ottone, after carrying on for years an almost uninterrupted warfare against the partisans of the Della Torre, gave up the temporal government to his nephew Matteo Visconti, whom he caused to be elected 'captain of the people' for five years, in 1288. Matteo was a prudent and temperate ruler, and he enjoyed general favour among the people. He defeated the Torriani and their ally the Marquis of Monferrato, in an irruption which they made into the Milanese territory in 1290. After the expiration of the five years of his office, he was confirmed in it by the voice of the citizens, and in 1294 was appointed, by Adolf of Nassau, imperial vicar in Lombardy, which dignity was confirmed to him by Albert of Austria, who assumed the crown of Germany after the death of Adolf in 1298. In the year 1300 Matteo married his eldest son Galeazzo to Beatrice d'Este, sister of Azzo, lord of Modena and marquis of Ferrara. Matteo entrusted Galeazzo with the command of the militia of Milan, against the Della Torre and their partisans, who still kept the field, and were supported by the people of Pavia, Cremona, Lodi, and other towns, which were jealous of Milan. Galeazzo was very different from his father; he was young, inexperienced, and rash: he was repeatedly defeated, and at last the Torriani re-entered Milan, in 1302, and Matteo Visconti withdrew to Nogarola near Verona, where he had a small property. His son Galeazzo took refuge at Ferrara.

Guido della Torre was put in the place of Matteo Visconti, as 'perpetual captain of the people,' and he continued in his office till 1311, when Henry of Luxemburg having gone to Italy to be crowned emperor, Guido opposed him, and was in consequence driven away from Milan by the imperial troops, assisted by the Visconti and their friends. From that time the Torriani remained exiles from their country. Matteo Visconti resumed his authority over Milan, being appointed imperial vicar by Henry, to whom he paid 40,000 golden florins. His son Galeazzo was likewise appointed imperial vicar of Piacenza. Some time after, Matteo, by a stratagem, obtained possession of Pavia, where he placed Luchino, another of his sons, as governor. Alessandria, Tortona, Cremona, Bergamo, Lodi, and other towns acknowledged in succession the rule of Visconti.

Cassone della Torre, who had been elected archbishop of Milan in 1308, having become an exile with the rest of his family, obtained of the pope his removal to the see of Aquileia. The see of Milan having thus become vacant, Matteo Visconti caused one of his sons, Giovanni, to be elected by the chapter, according to the old canonical form. The pope, John XXII., refused to acknowledge the new archbishop, and he appointed Aicardo, a Franciscan friar. Matteo forbade Aicardo from going to Milan. The pope then ordered proceedings to be instituted against Matteo Visconti, on the charges of heresy, sacrilege, and other crimes, and summoned him to Avignon to defend himself. Robert of Anjou, king of Naples, was appointed by the pope imperial vicar in Lombardy, for the pope assumed the right of appointing vicars during the vacancy of the imperial crown, which was then contested between Louis of Bavaria and Frederic of Austria. An army of Frenchmen, or Provençals, under the count of Maine, crossed the Alps and marched against Milan. Matteo sent his son Galeazzo with a strong force to meet the enemy on the river Sesia, and he found means, by negotiations and bribes, to induce the Count of Maine to retrace his steps into France without coming to blows. The pope however excommunicated Matteo and his sons, in 1321, because he would not resign his authority and acknowledge King Robert as imperial vicar in Lombardy, and the inquisitors appointed by the pope summoned him to appear before them at a church near Alessandria. Matteo sent in his place one of his sons, Marco, escorted by a body of troops with flying colours, at the sight of which the inquisitors withdrew to the town of Valenza in Monferrato, whence they issued their sentence of condemnation against Matteo Visconti on twenty-five charges, several of which consisted in his having laid taxes upon the clergy and exercised temporal jurisdiction over them; in having interceded for the abbess Mainfreda who had been burnt for heresy at Milan, in the year 1300; in entertaining himself heretical opinions, and being leagued with dæmons. He was in consequence condemned as a confirmed heretic, degraded from all honours and offices, and stigmatized as perpetually infamous; all his property was declared to be confiscated, and his children and grandchildren were excluded from every honour, dignity, and office. This extraordinary sentence was given on the 14th March, 1322, in the church of Santa Maria of Valenza, and signed by Aicardo, archbishop of Milan, and four Dominican Inquisitors, in presence of the cardinal legate, Bertrand du Poiet, who afterwards proclaimed from the neighbouring town of Asti a plenary indulgence to all those who took up arms against Matteo Visconti and his adherents. Raynaldus, in his continuation of the Annals of Baronius, acknowledges that these violent proceedings against Visconti were instigated by party spirit, and Pope Benedict XII., in his bull of the 7th May, 1341, denounced them as unjust and null.

At the time, however, Matteo's situation was very critical. His enemies took the part of the legate, and the people in general were horrorstruck at the solemn denunciations against him. Matteo protested that he was no heretic, and that he was falsely accused; and having one day convoked the body of the clergy in the cathedral of Milan, he repeated loudly before them the creed, professing that he believed and had ever believed in the tenets therein expressed. But the feeling of his danger and humiliation preyed upon the old man's mind (he was then seventy-two years old), and he died after a short illness, in June of the same year, three months after the sentence was pronounced against him. All the chroniclers speak of him as a wise and just man, the founder of the fortunes of his family, and some have styled him 'the Great.' His son Galeazzo I. was proclaimed lord of Milan. Upon this the pope issued an interdict against the city of Milan, and ordered all the clergy to leave the place, and he proclaimed a general crusade against the Visconti family. Numbers answered the call, and the command of the crusaders was given to Raymond of Cardona, nephew of the cardinal-legate. In June, 1323, the 'holy army,' as it was styled, approached Milan, and took possession of the suburbs, killing the men, violating the women, and burning the houses. But the Visconti had a strong party within the city, and they defended themselves until they received assistance from without. Marco Visconti, another son of Matteo, and a brave and enterprising captain, still kept the field, hovering on the flanks and rear of the crusaders. Louis of Bavaria, meantime having conquered and taken prisoner his rival Frederic of Austria, and being acknowledged king in Germany, sent a body of troops into Italy to assist the Visconti, who had incurred the wrath of the pope mainly because they had striven to maintain their delegated authority of imperial vicars against the assumptions of the pope, who would appoint his own vicars to the prejudice of the imperial authority. This was at least the ostensible ground which the Visconti took, and a plausible one it was, and very convenient to the interests of the empire in Italy. The aid of Louis of Bavaria and the exertions of Marco Visconti saved Milan. The crusaders withdrew to Monza. The pope, in July of that year, excommunicated Louis of Bavaria for having assumed the title of King of the Romans without the papal approbation, and also for having assisted the heretical Visconti. Louis then held a diet of the empire at Nürnberg, in which he protested against the interference of the popes in the temporal concerns of the empire, and appealed to a general council of the church. In the year 1324 a battle took place at the bridge of Vavrio on the Adda, between the papal or crusade troops and those of the Visconti, in which the former were defeated. Cardona was taken prisoner, and those who escaped shut themselves up in the town of Monza, which, after a siege of some months, surrendered to Galeazzo Visconti.

In 1327 Louis of Bavaria went to Italy, and was crowned at Milan with the iron crown of Lombardy, in May of that year. He also recognised Galeazzo Visconti as imperial vicar over Milan, Lodi, Pavia, and Vercelli. But a few days after, a quarrel, the grounds of which are not ascertained, broke out between Louis and Galeazzo, instigated, it would seem, by Marco Visconti, who was envious of his brother. About the same time Stefano Visconti, another son of Matteo, died suddenly. Galeazzo, his son Azzo, and his brothers Luchino and Giovanni, were arrested by order of Louis, and shut up in the dungeons of Monza. After eight months' confinement they were liberated, in March, 1328, by the intercession of Castruccio Castracani, lord of Lucca, and a favourite of Louis of Bavaria. Galeazzo died soon after in exile, whilst Milan was temporarily governed by a council of 24 citizens. Louis of Bavaria was crowned emperor at Rome, in May, 1328, by the antipope Nicholas V., whom he had set up in opposition to John XXII. The people of Rome, tired of the residence of the popes at Avignon, acknowledged Nicholas, and the people of Milan did the same. Louis of Bavaria, being in want of money, sold to Azzo Visconti, son of

Galeazzo I., the appointment of imperial vicar of Milan, in January, 1329, for 60,000 golden florins; and the antipope Nicholas confirmed Giovanni Visconti, Azzo's uncle, as archbishop of Milan, made him a cardinal, and appointed him apostolic legate in Lombardy. John XXII., perceiving that he was in danger of losing all influence in Italy, came to terms with the Visconti through the mediation of the marquis of Este, and recognised Azzo as lord of Milan, releasing him and the people of Milan from excommunication. This was in September, 1329.

Azzo Visconti, being acknowledged lord by the council of the city of Milan, as well as by the pope, renounced all connexion with Louis of Bavaria and the antipope Nicholas. He ruled Milan for 11 years, during which he applied himself chiefly to improve the town, rebuild its walls, and pave the streets; he restored and embellished the palace raised by his grandfather Matteo, and employed for the purpose the painter Giotto of Florence and the sculptor Giovanni Balducci of Pisa. Azzo Visconti was a good prince, and when he died, in August, 1339, more than three thousand citizens voluntarily put on mourning for him. He was the first lord of Milan who struck coin in his own name, omitting that of the reigning emperor. He left no issue, and the council-general, after his death, proclaimed joint lords of Milan his two remaining uncles, Luchino and Giovanni Visconti. Giovanni however, being a clergyman and of a quiet character, left to his brother Luchino all the cares of government.

Luchino Visconti was an able, determined, and not very scrupulous man. To the several towns besides Milan which acknowledged the rule of his nephew Azzo, he added the towns of Asti, Bobbio, Parma, Crema, Tortona, Alessandria, and Novara, thus making himself lord of the greater part of Lombardy and Monferrato. He obliged also the Pisans to become tributaries to him. He established a regular police, and severely punished all offenders against the law, without distinction of party. He appointed a judge of appeals at Milan, who was styled 'Exgravator,' who decided summarily. It was determined that this magistrate should be a foreigner, without relations or connexions in Milan. In Luchino's time the manufacture of silks was established at Milan, and agriculture, and especially the cultivation of the vine, was improved, as well as the breed of horses and cattle. Luchino however had vices which marred his good qualities: he was suspicious, lustful, and revengeful. He banished his three nephews, sons of Stefano Visconti, and let them wander abroad in poverty. He put to death Pusterla, a Milanese noble, and his wife Margherita, because she would not listen to his addresses. Isabella Fieschi, Luchino's wife, was in this respect a match for her husband, being notorious for her loose conduct. Luchino threatened to punish her, but he died suddenly, in January, 1349, and it is hinted by contemporary chroniclers that he died of poison.

By the death of Luchino, the archbishop **Giovanni Visconti** remained sole lord of Milan. He was of a mild and quiet disposition: he made peace with his neighbours the marquis of Monferrato, the count of Savoy, and the Genoese; he recalled from exile his nephews Matteo, Barnabò, and Galeazzo, sons of Stefano Visconti, and he obtained the hand of Bianca of Savoy for Galeazzo, and that of Regina della Scala for Barnabò. He purchased of Giovanni Pepoli the dominion of Bologna, by the payment of 200,000 golden florins, in 1350. Pope Clement VI. claimed the possession of Bologna as an old dependance of the Roman see, and, as Giovanni refused to give it up, the pope excommunicated him, but soon after came to a compromise, by which Giovanni retained Bologna, with the title of 'Vicar of the Holy See.' Giovanni Visconti had been elected Archbishop of Milan by the chapter, first in 1317, and again in 1339, after the death of the friar Aicardo, and in 1342 Clement VI. confirmed him in his see.

In 1353 the Genoese, having been defeated at sea near the coast of Sardinia by the Venetians, and their town being blockaded by the forces of the king of Aragon, who was allied with the Venetians, offered to the Archbishop Visconti the lordship of their city, stipulating for the maintenance of their municipal liberties. Visconti sent a garrison to protect the town, and in the following year a new fleet sailed from the harbour of Genoa bearing on its colours the arms of the Visconti. This fleet, commanded by Pagano Doria, obtained a complete victory over the Venetian fleet on the coast of the Morea. In the same year (October, 1354) the Archbishop Giovanni Visconti died, leaving Milan in peace and in a prosperous condition. He was the last good ruler of the Visconti line: those who came after him were all bad, and some of them abominable. It was during the government of Giovanni Visconti that Petrarch repaired to Milan, where he was induced to remain by the archbishop, who paid him great respect.

After the archbishop's death, his three nephews, **Matteo**, **Galeazzo**, and **Barnabò**, conjointly succeeded him in the lordship of the town of Milan and its territory, but they divided among them the other towns which had become subject to the Visconti. Matteo had for his share the towns south of the Po, namely, Bologna, Parma, Piacenza, and Bobbio, besides Lodi; Barnabò had the towns east of the Adda—Brescia, Bergamo, Crema, and Cremona; and Galeazzo took for himself Pavia, Asti, Alessandria, Tortona, Vercelli, Novara, Vigevano, and Como.

In January, 1355, Charles IV. of Germany went to Italy to be crowned, and was received by the brothers Visconti with great magnificence, and he appointed them his imperial vicars in their respective dominions. In September of the same year Matteo Visconti died suddenly, and it was said of poison administered by his brothers, who divided his share of the territory between them. The city of Bologna however was lost to the Visconti through the treachery of the governor Oleggio, who sold it to the pope's legate. Barnabò insisted upon having Bologna again, and sent a body of troops for that object in 1360, but was defeated by the army of the pope, who at the same time excommunicated Barnabò. Barnabò laughed at the excommunication, and told the archbishop of Milan that he was determined to act as pope and emperor in his own dominions. Innocent VI. sent legates to Barnabò to treat with him, but Barnabò obliged the legates to eat the Papal bulls and swallow them piece by piece. One of these legates afterwards became pope under the name of Urban V., and he preached a crusade against Barnabò in 1363, and again by a new bull in 1368. On this last occasion, the emperor, the queen of Naples, the marquises of Ferrara, Monferrato, and Mantua, and other Italian princes, formed a league with the pope against Barnabò, who however contrived to avert the storm and to conclude a peace in 1369. He did not recover Bologna, for which the pope paid him a sum of money. Gregory XI., who succeeded Urban V., again attacked Barnabò, and prevailed upon the emperor Charles IV. to deprive both him and his brother Galeazzo of their dignity of imperial vicars, in 1372. A desultory war was carried on in Lombardy and Romagna for some years, during which the papal officers and troops committed so many excesses, that the Florentines, Pisans, and others joined Barnabò in an alliance, which was styled 'the league against the iniquitous clericals.' The Visconti made the clergy of their dominions pay the expenses of the war. Two Franciscan monks, who dared to remonstrate with Barnabò for his extortion, were burnt alive by his order. The stories that are told of Barnabò's ferocity are almost incredible, and yet many of them seem well attested. He was very fond of hunting, kept large packs of hounds, and was very cruel to any one who killed game. He kept a number of concubines, by whom he had many children. The only good quality mentioned of Barnabò is that he put down the factions and forbade even the mention of the names of Guelphs and Guibelines under pain of having the tongue cut off. His brother Galeazzo, who had fixed his residence at Pavia, was no less cruel, though less impetuous and more calculating. His horrid penal edict against state prisoners is a fearful instance of the ingenuity of man in tormenting his fellow-creatures. It was styled 'Galeazzo's Lent,' because the tortures were so distributed as to last forty days before the wretched victim received the death-blow. At the same time Galeazzo encouraged learning, which Barnabò despised; he opened the University of Pavia about the year 1362, and collected a considerable library. Galeazzo married his son Gian Galeazzo to Isabella, daughter of King John of France, and he gave his daughter Violante in marriage to Lionel, son of Edward III. of England. Galeazzo II. died at Pavia in 1378, and was succeeded by his son Gian Galeazzo, styled count of Vertu, from the name of a fief in France which his wife Isabella brought him as her dowry.

Barnabò continued to rule Milan and the rest of his territories till May, 1385, when his nephew Gian Galeazzo, under pretence of having an interview with him, went to Milan with a large escort, surprised Barnabò, and shut him up in the castle of Trezzo, where he died seven months after. Gian Galeazzo allowed the populace of Milan to plunder the houses of Barnabò and of his sons, who were all excluded from the succession by a decree of the general council, and Gian Galeazzo was proclaimed sole lord of Milan and its dependencies, which consisted of twenty-one towns. But he aspired higher; he aimed at making himself king of Italy, or at least of North Italy. With the assistance of Francesco da Carrara, lord of Padua, he drove away the Della Scala from Verona and Vicenza, and afterwards turned against his ally and took Padua, and he confined Carrara in the dungeons of Monza, where he died. He seized Bologna by force, as well as part of Romagna, crossed the Apennines and took Perugia and Spoleto. He bought the dominion of Pisa from Gherardo Appiani, who was lord of it; Siena gave itself up to him, and he repeatedly attacked Florence, the only Italian state that successfully opposed his ambitious career. Gian Galeazzo had in his pay the best mercenary troops in Italy, commanded by Jacopo del Verme and other celebrated condottieri. In May, 1395, Gian Galeazzo obtained of the emperor Wenceslas, for the sum of 100,000 golden florins, a diploma, creating him duke of Milan; and by a subsequent imperial diploma, dated October of the same year, the boundaries of the duchy of Milan were defined, and made to include 25 towns, from Verona, Vicenza, and Belluno on the east, to Alessandria and Tortona on the west. On the 5th of September, 1395, Gian Galeazzo was crowned with the ducal crown in the square of San Ambrogio, in presence of a vast multitude. He soon after began to build the new cathedral of Milan.

The German princes, indignant at the cession made by Wenceslas of the fair regions of Lombardy, deposed that weak emperor, and elected Robert count palatine as king of Germany, A.D. 1400. Robert went to Italy with some troops, and summoned Gian Galeazzo to restore to the empire the towns which he occupied. Gian Galeazzo sent Alberico da Barbiano, who defeated Robert near Brescia, and obliged him to recross the Alps into Germany. In 1402 Alberico was besieging Florence, and Gian Galeazzo was only waiting for the surrender of that city to declare himself king of Italy, when he was attacked by the plague which then prevailed in Lombardy, and died in the castle of Marignano in September of the same year. Thus was lost another chance for the union of Italy under a native prince.

Gian Galeazzo left two sons, both minors. The eldest, Giovanni Maria Visconti, fourteen years old, was proclaimed duke. The duchy however was reduced to very narrow limits by the revolt of most of the towns, and the conquests of the Venetians on one side, and of the pope and the marquis of Monferrato on the other. The young duke, when he came of age, proved pusillanimous, suspicious, and cruel. His cruelty partook of insanity. He delighted in seeing men, and even children, torn to pieces by large mastiffs which he kept for the purpose. A wretch called Squarcia Giramo, who had charge of his kennel, was his confidential friend and minister. Giovanni Maria is said to have caused his own mother to be poisoned. At last a conspiracy was formed against him, and he was stabbed to death on the 16th of May, 1412, at Milan, while on his way to church. Squarcia Giramo was torn to pieces by the people. The conspirators, among whom were several of the collateral branches of the Visconti, kept possession of Milan for a few weeks.

Filippo Maria Visconti, at that time twenty years of age, and brother to the late duke, was then staying at Pavia. He was heir to the ducal crown, as Giovanni Maria had left no issue. He was of a timorous, suspicious, and vindictive disposition, but not madly ferocious like his brother. Facino Cane, one of the generals of his father, and who, in the scramble that took place after the death of Gian Galeazzo, had made himself master of Piacenza, Alessandria, Tortona, Novara, and other places, died about the same time as the Duke Giovanni Maria. Beatrice Tenda, Facino's widow, had the command of his territories and of his veteran band of soldiers. It was suggested to Filippo Maria to marry the widow as the means of securing the ducal crown. He did so, and Filippo Maria at the head of Facino's soldiers entered Milan in triumph on the 16th June, a month after the death of Giovanni Maria. Among the officers of Facino Cane was a native of Carmagnola in Piedmont, named Francesco Bussone, to whom the new Duke Filippo Maria entrusted the command of his troops. The result was, that Bussone recovered for the duke Lodi, Crema, Vigevano, Bergamo, Brescia, Parma, and also took Genoa, which had thrown off the yoke of the Visconti ever since 1356. Francesco Maria afterwards quarrelled with his general, who went into the Venetian service. [Carmagnola, Francesco Bussone di.] But a worse act of ingratitude was perpetrated by Filippo Maria against his wife Beatrice, the maker of his fortune, who was much older than himself, and whom, upon some most improbable charge of infidelity, he caused to be beheaded, in September, 1418. After this Duke Filippo Maria lived until the time of his death with Agnese del Maino, a Milanese woman, by whom he had one daughter, Bianca, whom he gave in marriage to Francesco Sforza.

After the defection of Carmagnola, Filippo Maria remained shut up in his ducal residence in the castle of Milan, unseen by his subjects, of whom he was afraid, and surrounded by abject and wily favourites. He had however the discernment to employ able commanders, though not equal to Carmagnola, at the head of his troops, and thus he managed to preserve the greater part of his dominions against the attacks of the Venetians and the Florentines. On one occasion the duke behaved with unexpected magnanimity to Alfonso of Aragon and Naples, who happened to be his prisoner in 1435, and whom he released with presents and even assisted in the recovery of his kingdom of Naples. [Alfonso V. of Aragon.] There was some political shrewdness in the character of Filippo Maria, who seems to have had that kind of circumspection and penetration, joined with utter want of principle, for which Italian statesmen were beginning to be noted, and which has been vulgarly styled Machiavellism, because Machiavelli happened to expound the common policy which he saw practised in his lifetime and which had been in practice for a century before him.

Filippo Maria reigned thirty-five years. He died at Milan in the year 1447. The events of the latter years of his life are briefly noticed under Sforza, Francesco, his son-in-law, who succeeded him as duke of Milan. The dynasty of the Visconti, which may be considered as having begun with Matteo, A.D. 1288, ended with Filippo Maria, and it constituted one of the most powerful Italian principalities of the middle ages.

(Verri, *Storia di Milano;* Muratori, *Annali d'Italia*.)

VISCONTI, E'NNIO QUIRI'NO, born at Rome in 1751, was the eldest son of Giovanni Batista Visconti, a native of Sarzana, who, being settled at Rome, where he married a lady of noble birth, became a great proficient in the science of archæology, and succeeded Winckelman as prefect of the antiquities of Rome. He was commissioned by Clement XIV. to collect works of antient art for the new museum of the Vatican, an office in which he was confirmed by Pius VI. Giovanni Batista intended his eldest son, who gave very precocious evidence of extraordinary talents, for the church, in which he was sure of patronage; and he made him study the law, in which young Visconti took a doctor's degree in 1771. The pope appointed Ennio Visconti to an honorary situation in his household, and made him sub-librarian of the Vatican. The young man however felt no inclination for a life of celibacy, as he had conceived an attachment for a young lady of the name of Doria. His father was greatly disappointed at this, and, in order to conquer his son's opposition, he induced the pope to remove him from the office of sub-librarian, and deprive him also of a pension which he had granted him. Young Visconti however bore this without complaint, while Prince Sigismondo Chigi, who had become acquainted with him, appointed him his own librarian, and gave him board and lodging in his palace. It was Ennio Visconti who recommended to the prince, for the post of under-librarian, Carlo Fea, who became afterwards a distinguished antiquarian. In 1778 the elder Visconti was commissioned to write the text or letterpress which was to accompany the series of engravings of the Museum of the Vatican, or 'Museo Pio Clementino,' as it was called, in honour of the two popes who contributed to form that splendid collection. Giovanni Batista, being old and infirm, found himself insufficient for the task, and he called his son Ennio to his assistance. The first volume of the series of the 'Museo Pio Clementino' appeared in 1782. In 1784 the elder Visconti died, and his son edited alone the second volume. He was then made by the pope Conservator of the Capitoline Museum, his pension was restored to him, and in January, 1785, he married his betrothed, Angela Doria. He continued afterwards to publish in succession the other volumes of the 'Museo Pio Clementino,' the seventh and last of which appeared in 1807. In the mean time he wrote many other treatises and disquisitions on antient art, such as a dissertation on the sepulchral monuments of the Scipio family, a description of the museum of Thomas Jenkins, a dissertation on the mutilated statue vulgarly called Pasquino, another on a fine cameo representing Jupiter Ægiochos, found at Smyrna, and an illustration of two Greek inscriptions belonging to a temple and sepulchral enclosure built by Herodes Atticus at a place called Triopium, a few miles out of Rome, on an estate of his wife, Annia Attilia Regilla—'Iscrizioni Triopee, ora Borghesiane, con versioni ecc.,' Rome, fol., 1794. [Herodes, Tiberius Claudius Atticus.] He afterwards wrote illustrations of the monuments found among the ruins of Gabii, which were discovered by Prince Marcantonio Borghese, and placed in his villa on the Pincian Mount—'Monumenti Gabini della Villa Pinciana, descritti da Ennio Quirino Visconti,' 8vo., Rome, 1797.

When the French entered Rome, in February, 1798, and abolished the papal authority, Visconti was made a member of the provisional government; and when a republican constitution was proclaimed, he was appointed one of the five consuls of the republic. As usual in such cases, he was censured by some for having accepted a revolutionary office, whilst the more violent demagogues accused him of being too moderate in the exercise of his official functions. After a few months however the French military authorities appointed new consuls, and Visconti was glad to return to his favourite studies. When the Neapolitan army entered Rome, in November, 1799, Visconti, having filled an office under the republic, was obliged to emigrate to France, where his reputation as one of the first archæologists of his age had preceded him. He was appointed one of the administrators of the Museum of the Louvre, and professor of archæology. There he found himself again among his familiar acquaintance, the masterpieces of the Vatican, which had been transferred to Paris, and he made a catalogue raisonné of the new museum, which was often reprinted with fresh additions. In 1804 Napoleon commissioned him to select and publish a series of portraits of distinguished men of Greece and Rome, such as might be considered sufficiently authentic, with illustrations. This, perhaps the greatest work of Visconti, was published in two series:—'Iconographie Grecque,' 3 vols. 4to., 1808; and 'Iconographie Romaine,' 1 vol. 4to., 1817. Meantime he undertook, at the desire of Napoleon, to contribute several important papers to the great collection entitled 'Musée Napoléon.' He also wrote a number of separate dissertations upon particular objects of antient art. In 1815 Visconti came to London for the purpose of giving his opinion on the merit and the value of the sculptures of the Parthenon known by the name of the 'Elgin Marbles.' He fixed the price at which he estimated that those works of art might be fairly purchased by the nation. After his return to Paris he wrote a Memoir in explanation of the meaning of those celebrated sculptures. He next completed a series of notices of the works of art in the Borghese collection, which he had begun at Rome many years before, and which were published after his death: 'Illustrazioni di Monumenti scelti Borghesiani,' Rome, 1821.

In 1816 Visconti began to feel the symptoms of an organic disease, which brought him to the grave in February, 1818. His death was mourned by the learned all over Europe, and his funeral was attended by distinguished men from various countries. He was no mere antiquarian, but was deeply versed in the history, the languages, the mythology, and the manners of the classical ages, and he had a keen discernment and a delicate taste for the works of antient art. A worthy successor of Winckelmann, his judgment was more precise and his views were more extensive than those of his predecessor. A collection of all Visconti's works was begun at Milan in 1818, but has never been completed. Labus edited, in 1827, a selection of his minor works in 4 vols. 8vo.

('Elogio d'Ennio Quirino Visconti, scritto dall' Abate G. B. Zannoni, R. Antiquario della Galleria di Firenze,' in No. XVIII. of the *Antologia* of Florence; Tipaldo, *Biografia degli Italiani Illustri*; Maffei, *Storia della Letteratura Italiana*.)

VISCONTI, FILIPPO AURELIO, younger brother of Ennio Quirino, was appointed by Pius VI., in 1782, to succeed his father Giovanni Batista, as superintendant of the antiquities of Rome. During the French occupation of Rome, 1809-14, he was made president of the commission of antiquities and fine arts, and was also one of the deputies appointed to superintend the preservation of the numerous churches of Rome. After the restoration of the Papal government he was appointed, in 1816, secretary of the commission of the fine arts. He edited the 'Museo Chiaramonti,' being a description of the collection formed in the Vatican by Pius VII., and which forms a sequel to the 'Museo Pio Clementino.' He also published several dissertations concerning works of antient art in Rome and in its territories. He applied himself especially to the study of numismatics. He edited an improved edition of the 'Roma' of Venuti. He died at Rome in 1830. (Tipaldo, *Biografia degli Italiani Illustri*.)

VISCOUNT, the name of a dignity which ranks fourth in the peerage, immediately above that of baron. It is the most recent English title, having, it is said, its origin in the time of Henry VI., who, in 1440, created by letters patent John, lord Beaumont, Viscount Beaumont. In Scotland the title of viscount was first granted by James VI.

Camden observes that although this is a new title of dignity, yet it is an antient one of office: viscount, 'Vicecomes,' the deputy of the count or earl, is the Latin name for the sheriff of a county [Sheriff], an office in antient times held by persons of the highest rank. Whether the title of viscount was suggested by that office it is difficult to say; but Spelman mentions that William the Conqueror made Baldwin hereditary viscount (vice-comitem) of Devon and baron of Okehampton; and 'he made Urso de Urso Abtot viscount of Worcester, but Roger his son was deprived of the title by Henry I., because he had killed a certain servant of the king; the office however was transferred through his sister to the Beaumonts.' Spelman seems in these passages to consider this title as one of dignity before Henry VI.'s time, and as having been distinct from that of sheriff: in the first instance he joins it to the title of baron and gives it precedence; in the second, he treats the Beaumonts, who are usually deemed the first viscounts, as only restored to a title which had been in abeyance or forfeited for three centuries.

(Spelman, title *Vice-comes, nomen dignitatis*; Camden's *Britannia* (Gough's), i., cxciv.; 2, 299; 4, 24.)

VISCUM. [Misseltoe.]

VISEU, the chief town of a Comarca of the Portuguese province of Beira. It is 40 miles north-east from Coimbra and 134 miles north-north-east from Lisbon. Its site is elevated, but fertile, and covered with vines, olives, and fruit-trees. Viseu is tolerably well built; two towers of the cathedral, which stands in the highest part of the town, are said to have been built by the Romans. There are two parochial churches; two convents, one for females; two hospitals; and a college: the squares and promenades are spacious. The town is an episcopal residence; the bishop of Viseu is a suffragan of the archbishop of Braga. A great fair, one of the most considerable in Portugal, is held annually in Viseu. The town of Viseu had, in [illegible], 6500 inhabitants; the comarca 150,500. Ferdinand the Great took the town from the Moors, for the fifth time, on the 25th of July, 1057. (*Dictionnaire Géographique*.)

VISHN'U (from *vis*, 'to enter' or 'to pervade') occupies the second place in the Trimûrtti, or Triad of the Hindus, and is the personification of the preserving principle. There is no doubt that his worship is of a very antient date, as there are distinct allusions to him in the Vedas; but at the same time it is evident that it has experienced successive and considerable changes, and that the forms under which Vishn'u is now worshipped in India are far from being authorized by the antient scriptures of the Hindus.

In the Vedas, Vishn'u generally appears only as the younger brother of Indra, the personified firmament, and inferior to him. It is however difficult to state what office is ascribed to him; in a passage of the Rigveda (i. 1. 14.

v. 7. p. 171, ed. Rosen) he is mentioned as guarding a certain sacrifice for the Maruts, or the winds; and his name occurs for the most part in invocations to Indra and other elemental deities; but in a capacity apparently inferior to theirs. (*Sâmaveda-Sanhitâ*, i, iv. 10, v. 4; ii. 2, v. 19; ii. 6, v. 11; *Ibid.*, v. 19; ii. 13, v. 18.) Sometimes however we find him addressed as a mighty God (*Ibid.* i. 5, viii. 6), who has the power to impart supernatural knowledge and superior strength of intellect, and in other passages (*Ibid.*, ii. 17, v. 4; i. 3, iii. v. 9; ii. 18, v. 5; *Rĭgved. Sanh.*, i. 1, v. 4) he is supposed to have numerous forms and to assume a superiority over the other gods, saying: 'I am all-glorious:' the mystic word with which his worshipper is directed to address him is 'vashat.' He is also stated to have traversed the world with three steps, in order to uphold the performance of sacrificial rites, and the following injunction is given:—'Regard well the works of Vishn'u; for on their account are you allowed to put your hand to sacred rites. The glorious sages look to the steps of Vishn'u, as to the radiance spread through the heavens.' (*Sâmav.-Sanhitâ*, p. 253, transl. Stephenson.) This journey throughout the seven regions of the universe, which alludes to the Vâmana Avatâra, has occasioned the epithet *Urukrama*, with which he is distinguished in a passage of the Rĭgveda (p. 179, ed. Rosen), and which Colebrooke (*Essays*, i. p. 78) translates—'He whose step is vast.' In another text of the Vedas, adduced by Colebrooke in his 'Essay on the Religious Ceremonies of the Hindus' (*Ibid.*, p. 27), Vishn'u is termed 'the lord of mountains.' But from all these and numerous other passages of the same kind it is scarcely possible to determine what place had been assigned to Vishn'u in the original mythology of the Vedas; and the only conclusion we arrive at is that legends concerning him must have been current among the Hindus even in the earliest age of their existence, and that these must certainly have contained the germ of the fantastic and elaborate biography which in the present day forms the sum of the Vaishn'ava religion.

There is no trace of Vishn'u or anything relating to him n the Institutes of Manu, although the allusions which are made to idolaters and the worship of inferior gods (book ii., v. 152, 164) might possibly have some reference to him also. However we might be led to expect that more notice would have been taken of him by Manu, since the wo heroic poems, the Mahâbhârata and the Râmâyan'a, which are generally believed to belong to the same period of Hindu literature as the Dharmma-S'âstra, or Institutes, have for their subjects two of the latest incarnations of this god, who therein assumes the attributes of the one supreme god. He is stated to have appeared before the other celestials, and to have agreed, at their humble request, to become man for the purpose of destroying the dæmon Râvan'a [Sanscrit Language and Literature, p. 398], and to remain incarnate among men for the space of eleven thousand years in order to protect the world after aving it. (*Râmâyan'a*, book i., sect. xiii., s'l. 23, ed. Serampore.) From the numerous allusions which both these poems make to the other Avatâras, descents or incarnaions of Vishn'u (*Ibid.*, i., xxiv. 22; xxvii. 2; lxvii. 15, &c.), we may safely conclude that at the time of their composition his history had already been brought into a system, where the miraculous deeds which he performs seem calculated to call forth the special adoration of the Hindus.

The order in which these different Avatâras are supposed o have taken place is by no means fixed, and the discrepancy in the different authorities with regard to Vishn'u's actions on earth is sometimes very great; we shall however follow the popular belief, and enumerate the descents of Vâsudeva accordingly.

His first incarnation was that of a fish, when, in order to save a righteous king named Manu, and to preserve the sacred Vedas, he appeared before him and warned him of an impending Pralaya, or universal destruction of the world at the end of a Kalpa, or age, by means of a flood. He at the same time ordered Vaivas'wata Manu to build an ark wherein he was to gather the seeds of all things. The king does his bidding, and when the earth is overspread with the inundation, the fish ties a rope to the ark and draws it after him until he arrives at a peak of the Himavat, o which he binds it. This mountain-top is hence called Naubandhana, from *nau*, a ship, and *bandhana*, binding. *Matsyopâkhyâna*, s'l. 49, p. 6, ed. Bopp.) This is the most primitive account of the Matsyâvatâra, or descent in the shape of a fish, as told in the Mahâbhârata; subsequent embellishments have been added to it, and the form in which it now is current is the following:—Vishn'u is said to have assumed the figure of a fish, in order to recover from the bottom of the ocean the books of sacred law, which had been stolen from heaven by a dæmon. (Kindersley, *Specimens of Hindoo Literature*, p. 14; Elphinstone's *History of India*, vol. i., p. 171.) The Gitagovinda (i. i. v. 5), though a production of later date, mentions only his having held the Vedas in his custody during the period of a Pralaya.

The second Avatâra was that of a tortoise, when Vishn'u placed himself under the mountain Mandara, when the gods and dæmons churned the Milky Sea for ambrosia. Of the gifts which proceeded from the ocean, *S'rî*, the goddess of beauty and prosperity, and *Kaustubha*, a miraculous jewel, fell to the lot of Vishn'u. This incarnation is called the *Kurma*.

The third Avatâra, or the Varâha, was occasioned by the world's having, at the close of a Kalpa, sunk to the bottom of the waters (*nârâ*), in which the Spirit of God (*nara*) had his first place of motion (*ayana*), and whence he is named Nârâyan'a, or 'moving on the waters.' (Sir W. Jones, *Manu*, i. 8, p. 2.) Nârâyan'a, *i.e.* Vishn'u, being desirous to raise it up, created another form for that purpose, and as in preceding Kalpas he had assumed the shape of a fish or a tortoise, so in this he took the figure of a boar (*varâha*), and plunged into the ocean, and uplifted the earth upon his tusks. He then raised it up, and placed it on the summit of the ocean, where, in the words of the Purân'as, it floats like a mighty vessel, and from its expansive force does not sink beneath the waters. He also levelled it, and divided it into seven continents for the general good and the habitation of created beings. (*Vishn'u Purân'a*, book i., ch. 4, Trans. pp. 27-33.) This Avatâra is related in different manners, and, like all the other, has been adapted to the peculiar doctrine of certain sects: in the Deccan, for instance, where the S'aivas [S'iva, p. 67, b], are numerous, it is asserted that Vishn'u dug up the foundations of the earth, that he might reach the sight of Si'va's feet.

The fourth Avatâra is the Nrĭsinha, which has more of a human interest than the preceding. Hiran'yakas'ipu, a king, enemy of the gods, had brought the three worlds under his authority, and usurped even the sovereignty of Indra, the first of the gods of the second order, by means of a boon which Brahmâ had bestowed upon him, and which was, that he should not be slain by any being then existing. His son Prahlâda did not however share the feelings of hatred which his father entertained towards the immortals; he had through the favour of Vishn'u obtained a perfect knowledge of divine matters, and was a faithful worshipper of Nârâyan'a. This caused Hiran'yakas'ipu to persecute him without mercy, and at last to determine to put him to death. In their last interview, the king, in derision of the omnipresence of Vishn'u, which Prahlâda had been maintaining, asked him, whether his favourite divinity was in a certain pillar which supported the hall. The answer was in the affirmative; and Hiran'yakas'ipu, enraged at this, was about to order his son's execution, when Vishn'u, in the shape of a man (*nrĭ*), with the head and paws of a lion (*sinha*), burst from the pillar, and tore him to pieces. This form of Vishn'u, the only one under which he could punish the infidel tyrant, forms one of the most conspicuous ornaments in Hindu architecture.

Vishn'u descended on earth for the fifth time as a Brahman dwarf (*vâmana*), when his object was to recover for the gods the supremacy over created things which they had lost by neglecting certain rites, and which Bali, the son of Virochan'a, a Daitya, like Hiran'yakas'ipu, had obtained by force of sacrifices and austerities;—the heavens alone had not yet fallen into his hands, and the gods were waiting in dread till the conclusion of his last sacrifice, which was to put them into his possession. During the performance of this yajna, or sacrifice, a dwarf appeared, who, applying to Bali for alms, was promised by the prince whatever he might demand, notwithstanding that the preceptor of the Daityas (the Titans of Hindu mythology) had apprised him whom he had to deal with. The dwarf demanded as much space as he could step over at three steps; and upon the assent of Bali, enlarged himself to such dimensions as to stride over the three worlds, which he gave, free from all embarrassment, to Indra. But as Bali was a descendant of Prahlâda, the virtuous son of Hiran'yakas'ipu, and as he consented to worship him, Vishn'u conceded to him the sovereignty of Pâtâla, or Hell. (*Vishn'u-Pur.*, p. 265, note.) In the Râmâyan'a (i. xxvii. 2, p. 302) it is stated that before this Avatâra Vishn'u had been performing penance for one hundred Yugas, or ages in the hermitage of Siddhâs'rama, practising sacred austerities as a model to all other devotees, probably because Bali could only be vanquished by a power similar to that by which he had obtained his supremacy—the power which is to be acquired through sacrifice and penance. It has been observed before, that this Avatâra is alluded to in the Vedas; it is told at length in the Râmâyan'a (sect. xxvii.), and forms a conspicuous episode in most of the Purân'as.

The sixth incarnation of Vishn'u was that of Paras'u-Râma, who washed off the sins of the earth with the blood of the Kshattriya race. Paras'u-Râma, or Jâmadagnya, seems however to be an historical personage, and is one of those deified heroes who are said to be portions of Vishn'u. His genealogy is related in the Vishn'upurân'a (book iv., ch. vii., p. 398). Rĭchîka, a Brahman, and a descendant of Bhrĭgu, married Satyavatî, the daughter of Gâd'hi; in order to effect the birth of a son, he prepared a certain dish for his wife, which was to infuse into her offspring the qualities suited to a Brahman, gentleness, knowledge, and resignation; but at the same time he had been cooking a dish for his mother-in-law. Satyavatî took the wrong mess, and when reprimanded for her inadvertence, she begged that the opposite qualities might not belong to her son, but to her grandson. Accordingly in due season she gave birth to Jamadagni, who married Ren'ukâ, and had by her the destroyer of the Kshattriya race, Paras'u-Râma, who was a portion of Nârâyan'a.

The story of the son of Jamadagni is told in the Vana-Parva of the Mahâbhârata, and a summary of it is given, in Jâmadagnya's own person, in the Râmâyan'a (i. lxii. s'l. 25-33). His first act was that of cutting off his mother's head at the command of his father, whom he however entreated to restore her to life; and this was granted to him, together with the boon of invincibility in single combat. Some time afterwards a mighty monarch of the name of Kârttavîrya, who had a thousand arms, came to the hermitage of Jamadagni, and carried off the calf of the milch cow of the sacred oblation. Râma assailed Kârttavîrya Arjun'a, and overthrew him in battle; but the sons of his foe attacked the hermitage of his father during his absence, and slew the pious sage. Upon this the son of Jamadagni made a vow that he would extirpate the whole Kshattriya race. Thrice seven times did he clear the earth of the caste which he wished to destroy; and he filled with their blood the five large lakes of Samanta-panchaka, from which he offered libations to the race of Bhrĭgu. He then gave the earth to Kas'yapa, the muni, and retired to the mountain Mahendra. Some authorities say that Mahendra was an island, which the Ocean had granted to him after he had given up the whole earth, and deprived himself of the privilege of living in it. Again other books state that, after destroying the military caste, he determined to retire from the world and lay down his arms; for this purpose he went to the sea-shore, and threw his weapons into the waves, which immediately rushed back to the place where they fell, and left a promontory, upon which he finally settled. He acquired his name of Paras'u-Râma on account of a battle-axe (*paras'u*), which he had obtained from S'iva for having vanquished in single combat Kârttikeya, the god of war.

The seventh Avatâra was Râma. [SANSCRIT LANGUAGE AND LITERATURE—*Râmâyan'a*, p. 398.]

The descent which usually follows this in the enumerations of them which occur in Sanscrit books of the last period of literature is that of Bala-Râma, the younger brother of Krĭshn'a, who was also a portion of Vishn'u. The histories of these two heroes are so blended together that we shall give an account of Bala-Râma in speaking of Krĭshn'a.

Vishn'u, perceiving that the enemies of the gods took care not to transgress the precepts of the Vedas, and thereby became powerful, emitted from his body, as his ninth Avatâra, an illusory form, which immediately proceeded to earth and taught the Daityas a false doctrine. Instead of faith, it inculcated discriminative knowledge, exclaiming to them, 'Know!' (*Budhyadwam*); and they replied, 'It is known' (*Budhyate*). Hence this great delusion was called Buddha; and the Daityas were soon induced by the arch-deceiver to deviate from their religious duties and at last to become so perverted that none of them admitted the authority of the Vedas. But when they had thus declined from the path of the holy writings, the deities took courage and gathered together for battle. Hostilities were renewed; but the armour of religion, which had formerly protected the Daityas, had been discarded by them, and upon its abandonment followed their destruction. (*Vishn'u-Pur.*, iii., ch. 18, p. 338.)

The tenth Avatâra is yet to come. It is thus related in the Vishn'u-Purân'a: 'When the practices taught by the Vedas and the institutes of law shall nearly have ceased, and the close of the Kali age shall be nigh, a portion of that divine being who exists of his own spiritual nature in the character of Brahma, and who is the beginning and the end, and who comprehends all things, shall descend upon earth: he will be born in the family of Vishn'uyas'as, an eminent Brahman of Sambhala village, as Kalki, endowed with the eight superhuman faculties. By his irresistible might he will destroy all the Mlechhas (or barbarians) and thieves, and all whose minds are devoted to iniquity. He will then re-establish righteousness upon earth; and the minds of those who live at the end of the Kali age shall be awakened, and shall be as pellucid as crystal. The men who are thus changed by virtue of that peculiar time shall be as the seeds of human beings, and shall give birth to a race who shall follow the laws of the Krĭta age, or age of purity. As it is said: "When the sun and moon, and the lunar asterism Tishya (its chief star is δ in Cancer), and the planet Jupiter, are in one mansion, the Krĭta age shall return."' (Wilson's *Vishn'u-Pur.*, p. 483.)

One of the earliest writers on Hindu antiquities expresses himself in the following words with respect to these Avatâras: 'It is sufficient to observe that those incarnations represent the deity descending in a human shape—either to accomplish certain awful and important events as in the instance of the three first; to confound blaspheming vice, to subvert gigantic tyranny, and to avenge oppressed innocence, as in the five following; or finally, as in the tenth, to establish a glorious system of benevolent institutions upon the ruins of a gloomy and sanguinary superstition. These surely are noble actions, these are worthy of a god; and it is principally to these different descents of Vishn'u that most of the allegorical sculpture and paintings of India have reference.' (Maurice's *Indian Antiquities*, vol. v., p. 855.) We shall however observe that, with the exception of the three first, and that of the Kalki, the Avatâras of Vishn'u are merely heroes who in times of emergency had distinguished themselves so as to merit deification. The story of Paras'u-Râma points to a struggle between the two principal castes, the Brahmans and the Kshattriyas, which is frequently alluded to in works of all periods of Hindu literature, and wherein the priesthood gained the victory. In the same manner as the Brahmans had Râma, the son of Jamadagni, to fight for them and to restore them to their supremacy, so had the Kshattriyas Râma, the son of Das'aratha, for their champion; and however strange or inconsistent it may appear, both these heroes, who are said to be portions of Vishn'u, are not only represented as the chiefs of two contending parties, who may have lived at two different periods, but they are brought together (as in the *Râmâyan'a*, i. lxii.), and Râma the Kshattriya is made to overcome Râma the Brâhmana. The ninth Avatâra is evidently intended for a warning to all orthodox Hindus against Buddha and his sect, who are diametrically opposed to the tenets of the Brahmanical religion. But of all these Avatâras, those of Râma and Krĭshn'a have in the present day the greatest share of adoration: they are not now considered as mere incarnations of Vishn'u—they are the god himself; and before we proceed to describe them as deified mortals, we shall give an account of the notion which the Vaishn'avas, or followers of Vishn'u, have of their god. We take as our authority the Vishn'u-Purân'a. Vishn'u is the same with Brahmâ and S'iva, that is, although he is only the preserver, he has nevertheless the qualities attributed both to the creator and the destroyer; for the Trimûrti is essentially one, and therefore every portion of it must be the same, although, when taken individually, it is different from the others. The world was produced from Vishn'u ; it exists in him ; he is the cause of ts continuance and cessation ; he is the world. His essence s both single and manifold (*Ekânekarûpa*), both discrete and indiscrete (*vyaktâvyakta*); that is, he is the indiscrete cause of the world, as well as the discrete effect. The four forms by which Vishn'u produces the phenomena of creaion, preservation, and destruction, are—1, Pradhâna, or primary matter ; 2, Purusha, or spirit ; 3, Vyakta, or visible substance ; 4, Kâla, or time (p. 9) ; at the same time he is the performer of the rites of devotion ; he is the rite; he is the fruit which it bestows ; he is the implement by which it is performed (p. 216). However these are only he qualities which distinguish him as the universal spirit, which is void of form ; but as Hari, Vishn'u is described in he following manner : Vishn'u, the glorious, the lord of he world, arrayed in yellow, with hand ornaments of glowing gold, riding on Vainateya, as the sun on a cloud, rrived with his conch, his discus, and his club in his hand (*Râmâyan'a*, p. 184, v. 23, 24) ; on his breast he wears he kaustubha gem, which was produced at the churning f the ocean. But all these arms and ornaments are, according to the Vishn'u-Purân'a (p. 158), types of the universe : 'The glorious Hari wears the soul of the unierse, undefiled, and void of qualities like the kaustubha gem. Intellect abides in Mâdhava, in the form of his mace. The lord supports egotism (Ahankâra) in its twofold division into elements and organs of sense, in the mblems of his conch-shell and his bow. In his hand Vishn'u holds, in the form of his discus, the mind, whose houghts (like the weapon) fly swifter than the winds. The necklace of the deity, composed of pearl, ruby, merald, sapphire, and diamond, is the aggregate of the five rudimental elements. The bright sword of Achyuta is holy wisdom, concealed at some seasons in the scabbard of ignorance,' &c. In this capacity of Vishn'u, as the only and supreme lord of the world, he is the husband of S'rî, or Lakshmî, who is his perfect counterpart. She is the mother of the world, she is eternal ; in like manner as he is all-pervading, so is she omnipresent. Vishn'u is meaning, she is speech ; Hari is understanding, she is intellect ; he is righteousness, she is devotion. The deity is content, Lakshmî is resignation ; he is desire, she is wish ; Hari is ll that is called male, S'rî is all that is called female ; here is nothing else than they. (*Vishn'u-Purân'a*, p. 60.) However in the usual mythology, as noticed before in peaking of the second Avatâra, S'rî is said to have arisen from the Milky Sea, when it was churned for ambrosia, and o be the goddess of prosperity and beauty. The king of irds, Garud'a, born of Kas'yapa, by Vinatâ, and hence alled Vainateya, or son of Vinatâ, serves him as the peruder of all, and is generally mentioned in connection with ishn'u when this god is represented in the above chaacter.

We have hitherto purposely abstained from mentioning ishn'u's Avatâra as Krïshn'a ; for although it is probably s antient as the others, it has facilitated, as it were, the ansition from the elder belief of the Hindus to that which we find them professing in our days, and serves for he foundation of the worship of deified heroes. Krïshn'a was a portion of Vishn'u, who had consented to be born of Devakî, the wife of Vasudeva. When the portion of Vishn'u had taken his abode in the womb of a woman, he planetary bodies moved in brilliant order in the eavens, and the seasons were regular and genial ; the irtuous experienced new delight, the strong winds were ushed, and the rivers glided tranquilly, when Janârddan'a was about to be born. At midnight, when the supporter f all was about to be born, the clouds emitted low pleasing sounds, and poured down rain of flowers. Kans'a, mighty dæmon, being however apprised that a child would be born that was for ever to overthrow their power, ummoned all his principal Asuras, or infidels, and told hem : 'Let active search be made for whatever young children there may be upon earth, and let every boy in whom there are signs of unusual vigour be slain without emorse.' But at the time that this order was given there was near the town of Mathurâ, the capital of Kans'a, a cowherd of the name of Nanda, whose wife had borne him a child, also a portion of Vishn'u, at the same hour as Devakî. To him Vâsudeva, the father of Krïshn'a, repaired, and delivered into his hands his son, that he might be brought up with the offspring of the cowherd. Nanda departed speedily with the other cowherds, and settled in Vrïndâvana ; and here Krïshn'a and Bala-Râma, accompanied by the cow-boys, traversed the forests, that echoed with the hum of bees and the peacock's cry ; and at evening-tide the two immortals, having come to the cow-pens, joined heartily in whatever sports amused the sons of the herdsmen. One day Krïshn'a came to the Yamunâ, which was flowing in sportive undulations and sparkling with foam, as if with smiles, as the waves dashed against the borders. Within its bed however was the fearful pool of the serpent Kâlîya. Krïshn'a jumped boldly into the lake of the snake-king ; a fearful combat ensued, which ended in the victory of the divine child, who commanded the snake-king to depart from the Yamunâ river to the ocean. About the same time his brother Râma destroyed the dæmon Dhenuka, who had assumed the form of an ass, and kicked Râma on the breast with his hinder heels. Râma however seized him by both hind-legs, and whirling him round until he expired, tossed his carcass to the top of a palm-tree. Shortly afterwards he killed the dæmon Pralamba, who sought to devour both the brothers, and had for that purpose assumed the shape of a cow-boy, that he might have an opportunity of effecting his purpose by mixing in their pastimes. Krïshn'a, as a boy, was naturally fond of annoying and playing tricks upon his elders, and he resolved to put the god Indra, whom the herdsmen worshipped, into a great passion. He persuaded his adoptive father Nanda to cease to offer sacrifices to Indra, from whom they had no benefit ; but much rather to worship the mountain Govarddhan'a, which offered shelter to themselves and pasture to their cattle. Accordingly the inhabitants of Vraja worshipped the mountain, presenting to it curds and milk and flesh. Krïshn'a had the satisfaction of obtaining his object ; for Indra, offended by the loss of his offerings, caused heavy rain to deluge Gokula ; but even his revenge proved vain. Krïshn'a uplifted the mountain to shelter the cowherds and their cattle. For seven days and nights did Indra rain upon the Gokula of Nanda to destroy its inhabitants ; but, foiled in his purpose, he commanded the clouds to cease, and descended from his heaven to praise Krïshn'a, whom he had recognised as the supporter of all, and to make him prince over the cattle. Meanwhile the young cowherd had grown, and he felt inclined to join with the Gopîs, or shepherdesses, in sport. Accordingly he instituted a kind of round dance, called the Râsa, when, by means of a miraculous power, he managed, although alone, to be the simultaneous partner of all those who joined in it. But the happiness of Krïshn'a and Bala-Râma in Vrïndâvana was interrupted by the tyrant Kans'a, who had been apprised of their existence, and had sent the formidable dæmon Kes'in to destroy them. Krïshn'a however slew him, and Kans'a was obliged to have recourse to perfidy. He sent a messenger to them, that they might be induced to go to Mathurâ, where public games had been instituted. Krïshn'a and Balarâma went there, and slew two mighty dæmons, Chân'ûra and Musht'ika, and at last Kans'a himself ; but their history is of too great a length, and we refer the reader to the fifth book of the Vishn'upurân'a, p. 491, of Professor Wilson's elegant translation. It will be sufficient to observe that in the course of his adventures Krïshn'a builds the town of Dwârakâ ; marries Rukminî and seven other wives ; and besides these he had sixteen thousand more, by whom he had one hundred and eighty thousand sons. At last he was killed by a hunter ; and then, in the words of the Purân'a, the illustrious Krïshn'a, having united himself with his own pure, spiritual, inexhaustible, inconceivable, unborn, undecaying, imperishable, and universal spirit, which is one with Vâsudeva, abandoned his mortal body and the condition of the threefold qualities. We have dwelt so long on the juvenilities of Krïshn'a, because they form the groundwork of the tenets of a particular class of Vaishn'avas, whom we shall notice in the sequel.

Vishn'u's heaven is called Vaikun't'a ; for a description of which we refer to the first volume of Ward's 'View of the Religion, Literature, &c. of India.'

His names are as numerous as those of S'iva, and may be found enumerated in the Krïshn'a-nâmasahasram, or 'the thousand names of Krïshn'a :' they are also partly given in the Amarakosha (i. i. 1, *sl.* 12-17), and of these we shall adduce those which occur most frequently, and are sometimes the cause of a good deal of confusion. They are Kes'ava, Dâmodara, Hrïshîkes'a, Mâdhava and Madhuripu, Janârddan'a, Achyuta, Govinda, Padmanâbhi, Vâsudeva, Trivikrama, Purushottama, &c.

By his wife Lakshmî, the goddess of beauty, he had Kâma or Manmatha, the god of love. The Purân'as, which are the text-books for the Vaishn'avas, are the Vishn'u, Nâradîya, Bhâgavata, Gârud'a, Pâdma, and Varâha, which are called Sâtwika, or pure and true.

Sects of Vaishn'avas.—The first authentic records we have of the different worshippers of Vishn'u date from the eighth or ninth century of our æra. At that time the two great divisions of Vaishn'avas and S'aivas were in a flourishing condition, and each embraced six subdivisions; those which belonged to the Vaishn'ava faith are the following:—

1. The *Bhâktas*, who worshipped Vishn'u as Vâsudeva, and wore no characteristic marks; their worship was that of the one supreme lord of the universe.

2. The *Bhâgavatas*, who thus called themselves from a name of Vishn'u, and impressed upon their persons the *Vaishn'ava* insignia, representing the discus, club, conch, &c. of their divinity. But they had an admixture of superstition in their religious creed, and reverenced the *Tulasî* plant and the *Sâlagrâma* stone, of which more will be said hereafter. The authorities of both these sects were the Upanishads and the Bhagavad-Gîtâ.

3. The *Vaishn'avas* differed only from the preceding sect by promising themselves a sort of sensual paradise after death in Vaikun't'a.

4. The *Pancharâtrakas*, who worshipped the female personifications of Vishn'u.

Besides these there were, 5, the *Vaikhânas'as*, and, 6, the *Karmmahînâs*, who abstained from all ritual observances.

These six sects, of which some have disappeared, have given rise to about twenty different schools, which for the greater part exist to this day. Amongst other divisions of less importance, the Vaishn'avas are usually distinguished into four principal Sampradâyos, or sects, of which the most antient and respectable is the S'rî Sampradâya, founded by the Vaishn'ava reformer Râmânuja Achârya, who lived about the middle of the twelfth century. The establishments of the *Râmânujîyâs* are still numerous in the Deccan, and the same country comprehends the site of the *Gaddi*, or the pillow-seat of the primitive teacher; his spiritual throne, to which his disciples are successively elevated; and this circumstance gives a superiority to the Achâryas of the south over those of the north of India. The worship of this sect is addressed to Vishn'u and to Lakshmî, and their respective incarnations, either singly or conjointly; and this causes many subdivisions according as these Vaishn'avas adore either Nârâyan'a or Lakshmî, or Lakshmî Narâyân'a, or Râma or Sîtâ, or Sîtâ-Râma, &c. Images of metal or stone are usually set up in the houses of the private members of this sect, which are daily worshipped, and the temples and dwellings are all decorated with the Sâlagrâma stone and the Tulasî plant. A peculiarity of this sect is that they always cook for themselves, and observe the most scrupulous privacy in eating their meals; if their food attracts even the looks of a stranger, the operation, whether of preparing or eating it, is immediately stopped, and the viands are buried in the ground.

The chief ceremony of initiation in all Hindu sects is the communication by the teacher to the disciple of the *Mantra*, which generally consists of the name of some deity, or a short address to him. It is communicated in a whisper; that of the Râmânuja sect is, *Om* Râmâya namah, *i. e.*, *Om* Salutation to Râma!

The Hindu sects are usually discriminated from each other by various streaks (*Bhaktichchheda*) on their faces, breasts, and arms; for this purpose all the Vaishn'avas employ a white earth called *Gopî-chandana*, which should be brought from Dwârakâ, it being said to be the soil of a pool at that place, in which the Gopîs drowned themselves when they heard of Krïshn'a's death. (This word means the 'sandal-wood of the Gopîs,' and is nothing but a kind of calcareous clay.) The followers of Râmânuja have for their authorities the *S'rî Bhâshya*, the *Gîta-Bhâshya*, the *Vedâsht'a-Sangraha*, and the eight Sâtwika Purân'as; besides numerous other works which are still current in various parts of India. The doctrine contained in these books is called the 'Vis'isht'âdwaita,' or doctrine of unity with attributes; for although the Râmânujas maintain that Vishn'u and the universe are one, yet, in opposition to the Vedânta school of philosophy, they deny that the deity is void of form or quality, and regard him as endowed with all good qualities, and with a twofold form—the supreme spirit, *Paramâtmâ*, or cause, and the gross one, the effect, the universe: and in these assertions they are followed by most of the Vaishn'ava sects. But besides Vishn'u's primary and secondary form as the creator and creation, he is worshipped in five different modifications: such as in his *Archâ*, objects of worship, as images, &c.; in his *Avatâras*; in certain forms called *Vyûhas*, which are Vâsudeva, Balarâma, Pradyumna, and Aniruddha; fourthly, in the *Sûkshma*, or subtile form. Every one of these forms requires a different mode of worship: these are the *Abhigamana*, or cleaning and purifying the temples, images, &c.; the *Upâdâna*, or providing flowers and perfumes for religious rites; the *Ijyâ*, or the presentation of such offerings, blood-offerings being uniformly prohibited by all the Vaishn'avas; the *Swâdhyâya*, counting the rosary, and repeating the names of the divinity or any of his forms; and lastly the *Yoga*, the effort to unite with the deity: the reward of these acts is elevation to the seat of Vishn'u, and enjoyment of like state with his own in a condition of pure extasy and eternal rapture.

The members of this sect are in the north of India called S'rî-Vaishn'avas, and are decidedly hostile to the Saivas, nor are they on friendly terms with those Vaishn'avas who worship Krïshn'a, although they acknowledge that deity to be an incarnation of Vishn'u.

Towards the end of the thirteenth century of our æra, Ramânanda, originally one of the earliest teachers of the tenets professed by the preceding sect, retired from the society, and established a schism of his own at Benares. The principal object of worship of Ramânanda's followers is Vishn'u as Râmachandra: they of course reverence all the other Avatâras, but they maintain the superiority of Râma in the present or Kali yuga; hence they are collectively known as *Râmavats*. They also reverence the Sâlagrâma stone and the Tulasî plant, and their forms of worship correspond with those of the Hindus in general, but some mendicant members of the sect consider all forms of adoration superfluous, beyond the incessant invocation of the name of Krïshn'a and Râma. They are known as *Vairâgis* or *Viraktas*. There are many subdivisions of this school, which it would be tedious to enumerate.

Amongst the twelve disciples of Râmânanda, the most celebrated of all was Kabir, who established a numerous sect who are called Kabir Panthis, for a description of which we refer to the 'Asiatic Researches,' vol. xv., p.

A sect of great influence, to which the most opulent part of the population of India belongs, is that of the Rudra-Sampradâya, or Vallabhâchâris. They attach themselves to the worship of Krïshn'a and his mistress Râdhâ, one of the Gopîs of Vrïndâvana, either singly or conjointly, as in the case of Vishn'u and Lakshmî among the Râmânujas, and Sîtâ and Râma among the Râmavats. There is however another form which is more popular still, although much interwoven with the other. This is the Bâla Gopâla or the Infant Gopâla (Cowherd—a name of Krïshn'a), the worship of whom is very widely diffused amongst all ranks of Hindu society, and which originated with the founder of the Rudra Sampradâya, Vallabha Achârya. The worship of Krïshn'a as one with Vishn'u dates evidently from the Mahâ-Bhârata, and his juvenile forms are brought preeminently to notice in the account of his infancy in the Vishn'u and other Purân'as; but none of these works discriminate him from Vishn'u, nor do they recommend his infantine or adolescent state to peculiar veneration. At the same time some hints may have been derived from them for the institution of this division of the Hindu faith. According to the Brahma-Vaivartta-Purân'a, which is the most decided in claiming supremacy for Krïshn'a, the residence of Krïshn'a is denominated Goloka (or the world of cows); it is far above the three worlds, and has, at five hundred millions of yojanas below it, the separate lokas of Vishn'u and S'iva, that is, Vaikun't'a and Kailâsa. There it was that he created all things: Nârâyan'a or Vishn'u proceeded from his right hand, S'iva from his left, Brahmâ from his head, Dharmma (the god of justice) from his breath, Saraswatî (the goddess of speech) from his mouth, Lakshmî from his mind, and Durgâ (the wife of S'iva) from his understanding, and Râdhâ (his own mistress) from his left ade. Three hundred millions of Gopîs (female cowherds), or companions of Râdhâ, exude from the pores of her kin; and a like number of Gopas, or companions of Krĭshn'a, from the pores of his skin: the very cows and heir calves, properly the tenants of Goloka, but destined o inhabit the groves of Vrĭndâvana, are produced from he same exalted source. Yet in this description of crea-ion the deity is still spoken of as a young man, and the Purân'a therefore affords only indirect authority for his vorship as a child. However the Vallabhâchâris refer to t. Their practices are of a similar character with those f other regular worshippers; their temples and houses ave images of Gopâla, who is represented as a chubby oy of the dark hue of Vishn'u, and who receives eight imes a day the homage of his votaries. Besides these iurnal ceremonials, there are several annual festivals of reat repute observed throughout India; of those in Ben-al and Orissa, the Ratha-yâtrâ, or procession of Jagannâtha n his car, is the most celebrated; but it is rarely held in pper India, and then only by natives of Bengal. The nost popular festival at Benares is the Janamash-t'amî, the ativity of Krĭshn'a, on the eighth day of Bhadra (Au-gust). Another is the Râsa-yâtra, or annual commemora-ion of the dance of the frolicksome deity with the sixteen Gopîs. This last is a very popular festival, and is celebrated vith the greatest solemnity.

The Brahma Sampradâya is a sect instituted in the south f India by Mâdhava Achârya, who was born in the Saka ear 1121 (A.D. 1199). The doctrine of the members of his sect is similar to that of the Rudra Sampradâya, with he exception that they deny the Moksha, or final emanci-pation; they also hold the Yoga [YOGA] to be impracti-able: for according to them life is one and eternal, de-pendent upon the Supreme (Vishn'u), and indissolubly con-ected with, but not the same with him; they quote the ollowing line from the Mahopanishad: 'As the bird and he string, as juices and trees, as rivers and oceans, as fresh vater and salt, as the thief and his booty, as man and ob-ects of sense—so are God and life distinct, and both are ver indefinable;' and this one from the Garud'a-Purân'a: From the difference between omniscience and partial nowledge, omnipotence and inferior power, supremacy nd subservience, the union of God and life cannot take lace.' This division of the Vaishn'avas is however con-ined to the peninsula, and is altogether unknown in Gan-getic Hindostan.

Besides these sects, which are the most conspicuous, the aishn'avas comprehend the Khâkis, Maluk Dâsis, Senais, Iira-Bais, Nimâvats, Charan'a-Dâsis, &c.

This account of the Vaishn'ava sects has been chiefly erived from Professor Wilson's valuable paper in the ifteenth volume of the 'Asiatic Researches,' to which we efer the reader for fuller information.

Most of these religious sects are divided into clerical and ay members, as it were: the bulk of the votaries, though ot always, belong to the latter; while the rest, or clerical lass, are sometimes monastic and sometimes secular. Of he cœnobitic members of the different communities most ursue a wandering and mendicant life; indeed all of them t some period have led such a life: but when old and in-firm they sit down in some previously existing *math*, or nonastery, or establish one of their own.

The Maths, Asthals, or Akâras, the residences of the nonastic communities, are scattered over the whole coun-ry; they generally comprehend a set of huts or chambers or the Mahanta, or superior, and his permanent pupils; a temple sacred to the deity whom they worship, or the Samâdh, or shrine of the founder of the sect, or some emi-nent teacher; and a Dharma Sâlâ, one or more sheds or buildings for the accommodation of the mendicants or tra-vellers, who are constantly visiting the Math. Ingress and egress are free to all: and indeed a restraint upon personal liberty seems never to have entered into the conception of any of the religious legislators of the Hindus.

Of the inanimate objects sacred to Vishn'u the Sâla-grâma stone is the principal; it forms a profitable object of traffic, and enjoys the highest veneration of most of the Vaishn'avas. The Sâlagrâmas are mostly ammonites, found in the bed of the Gandhakî river, of the size of an orange. The reasons why this stone is worshipped are very contra-dictory and by no means satisfactory. We refer to the most plausible ones in the 'As. Res.,' vol. xii., p. 264; W. Hamilton, 'Description of Hindostan,' vol. i., p. 620; Forbes, 'Oriental Memoirs,' vol. iii., p. 340; Tavernier, 'Voyages,' iii., ch. 5; and Ritter, 'Erdkunde,' vol. iv., p. 14. A mythological story is given by Colonel Wilford in the 14th vol. of the 'Asiatic Researches,' but it is highly absurd.

(Wilson, *Vishn'u Purân'a*, *Asiatic Researches*, vols. xv. and xvi.)

VISIER. [VIZIR.]

VISIN, or VON VISIN, DENIS IVANOVITCH, one of the most eminent Russian writers of the eighteenth century, and in his own peculiar walk the most eminent of them all, was born at Moscow, April 3rd, 1745, of parents in easy circumstances. Except in regard to moral instruction, to which point his parents were very attentive, his early education was a common one. He was sent first to the Gymnasium, afterwards to the University of Moscow, and while studying there was selected as one of the pupils to accompany the rector to St. Petersburg, to be presented to Count Shuvalov (the founder and patron of the establishment), as worthy of notice for their promising abilities. Their reception was flattering, and the splendour of the court and the more refined tone of the northern capital made a strong impression upon Von Visin. The theatre more especially appeared to him a region of enchantment, and he had an opportunity of becoming personally acquainted with Volkov [VOLKOV] and other leading actors of that time, a circumstance that contributed to encourage his taste for the drama. It was also his good fortune to meet with Lomonosov, whom merely to have seen was an event in his life, and from him he received some sound advice on the importance of pursuing his studies systematically. On his return to Moscow, and while he still continued at the university, he made his first essays in literature by translating Holberg's Fables, not from the original, but the German, and Terrasson's philosophical romance of 'Sethos,' which were followed by a version of Voltaire's 'Alzire'—a writer whom he then as greatly admired as he afterwards detested. Though these productions were reckoned by himself among the indiscretions of his youth, they served to make him known, and his Alzira more especially recommended him to the notice of the minister Count Panin, who bestowed on him an appointment in his own department, the duties of which were made little more than nominal, in order that he might prosecute his literary studies. Notwithstanding the apparent enviableness of a position that seemed to give both present enjoyment and a brilliant prospect for the future, Von Visin quarrelled with his good fortune, perhaps because it had come too easily, and, in consequence of jealousies and misunderstandings between himself and another protégé of the count's, quitted his employment and his patron. After this precipitate step he seems to have led for awhile a rather unsettled life, associating with companions who were of very libertine principles, and of by no means irreproachable conduct. From the ill-effects of their example he was partly preserved by infirmity of constitution and by his being subject at that time to almost continual headaches; and it was moreover his good fortune to be reclaimed from such dangerous connections by an intimacy which he shortly afterwards formed with an amiable family at Moscow.

Warned by the past and encouraged for the future, Von Visin began again to apply himself to study, and became ambitious of not merely succeeding as an author, but of enriching the literature of his country with productions of an original and national character. On surveying what had up to that time been done in the language, he perceived that a wrong course had been pursued—that instead of being allowed to show itself at will, native talent had been both misdirected and checked by imitation. The literature was in danger of becoming one of mere routine; epics, odes, tragedies, were all after established and 'approved models,' and though correct as to mere pattern, they were cold, colourless, and feeble.

He accordingly determined to give his countrymen a specimen of comedy—not a drama of the kind at second-hand, but such as should be, and should be felt to be, thoroughly Russian in every respect. The result was most successful: the 'Brigadier,' written and first performed in 1764, though not printed till nearly twenty years afterwards conferred on him immediate [illegible] less he showed himself in no hurry to [illegible] triumph of the kind, for it was [illegible] years afterwards that he produced his second piece, the 'Nedorosl,' or Spoiled Youth. In fact he seemed well content to live upon the fame of his 'Brigadier,' and the reputation it acquired for him both at court and with the public. He did not indeed lay aside his pen, but employing it chiefly in translating from the French, and among other things Barthélemy's 'Amours de Charité et de Polydore,' and Bitaubé's 'Joseph.'

In 1777 he visited France for the benefit of his health; and his residence at Paris seems to have greatly abated his admiration of the French people, and more especially of French philosophers. Unfortunately only six letters of his correspondence from that capital, with Counts Panin and Orlov, have been preserved, a circumstance the more to be regretted because, besides being interesting in themselves, they are superior specimens of style; and in fact Von Visin was by far the best Russian prose-writer of the last century. Restored to health and cured of his French predilections, he returned to St. Petersburg, where, after passing some time in inactivity, he produced, in 1782, his second and still more successful comedy, the 'Nedorosl.' This piece seems now an exaggerated picture of manners, even in Russia itself; yet that such is the case is rather an honour than a reproach to Von Visin, for by correcting the extravagances to which his satire was applied, he himself has destroyed the verisimilitude of his own picture. The 'Nedorosl' was his last dramatic production, for he seemed disposed to take Potemkin's compliment on the occasion as serious advice. 'Denis,' said the prince to him, after the first representation, 'there is now nothing left for you to do but go home and die, since, were you to live for ever, never again would you write anything half so good!' That celerity of composition and fertility of invention which distinguished Lope de Vega, Goldoni, and many other dramatic writers, were certainly not possessed by Von Visin; and, as has been further remarked by his critic Prince Viazemsky, his talent was rather that of a powerful comic satirist than that of a dramatic genius. Though he continued to write from that time, he produced nothing of importance—chiefly miscellaneous pieces for various journals, which would now be forgotten, but for the interest which they derive from the author's name. From this remark however must be excepted one production of permanent value, his 'Ispovied,' or Confessions, a sort of autobiography, from which it appears that he had long renounced the principles which he had imbibed at his first outset in life, and patiently submitted, as to salutary chastisement, to the affliction of almost uninterrupted ill health. He again recovered however in some degree, and once more applied to his literary occupations. His very last production of all was another comedy, entitled the 'Hofmeister,' which only the day before his death he put into the hands of Derzhavin and Dmitriev, who are said to have agreed with him that it was still better than his former ones. Nevertheless we are told that the MS. was lost, and could never afterwards be traced anywhere—so very strange a story, as to be scarcely credible. Von Visin died Oct. 1 (13), 1792, at the age of 47. Of his complete works two editions have since been published; yet it must be owned that although he did much for the literature of his country, it lies within a very small compass, and all the rest that he did does not appear to correspond to his reputation.

(Plaksin, in the *Entziklopeditcheskii Leksikon*; Snigerev, *Slovar*, &c.; Viazemsky, in the *Sovremennik*.)

VISION. [EYE; SIGHT.]

VISITATION. [ARCHDEACON; BISHOP.]

VISITOR. [SCHOOLS, ENDOWED.]

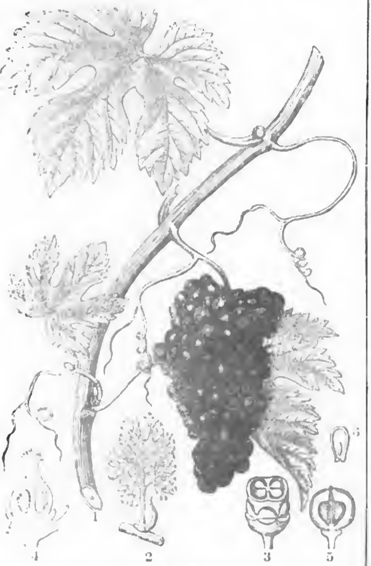
VISTULA (in Polish, *Wisla*; in German, *Weichsel*) is the principal river of Poland, though neither its source nor its mouth is in that kingdom. It rises at the foot of the Carpathians, near the village of Skotschau, in the circle of Teschen in Austrian Silesia. Taking partly an eastern course, it enters the kingdom of Poland at the south-western extremity, passes the antient capital, Cracow, forming the southern boundary of the republic. Leaving Cracow it turns to the north-east, dividing the kingdom of Poland from Galicia as far as Sandomir, where it turns first to the north, then to the north-west to Warsaw, then in a nearly westerly and north-westerly course till it leaves the Polish territory and enters Prussia a little above Thorn, below which it flows northwards to the Baltic. Before it reaches the Baltic it divides at Montau, below Marienwerder, into two branches, the smaller of which, called the Nogat, discharges itself into the Frische Haff. The larger or western branch, after flowing about thirty-five or forty miles farther, again divides at Fürstenwerder, nine miles from Danzig, into two branches, the smaller of which turns to the east, and empties itself into the Frische Haff, and the main stream taking the opposite direction discharges into the Baltic at Weichselmünde, north of Danzig. In its course through Poland it is joined by the following rivers: I. on the left by—1, the Nida; 2, the Pilica, which runs near the town of the same name, and falls into the Vistula twenty-five miles above Warsaw; 3, the Bzura. II. On the right—1, the Save, one of the larger affluents of the Vistula, which comes from Galicia, and runs along the frontiers of the kingdom for a short distance from Krzeizow to near Sandimir; 2, the Wieprz, which rises in the district of Zamosc; 3, the Bug, the largest of the tributaries of the Vistula, which however flows for a considerable distance along the eastern frontier of the kingdom, dividing it from Russia, turns to the west, and falls into the Vistula near Warsaw not far from Nowidwor and the fortress of Modlin (now called New Georgiewsk). The Bug having received in its course many rivers, among others the Narew, at a short distance from its junction with the Vistula, is almost equal to that river, which becomes by this addition one of the great European rivers. The whole course of the Vistula is about 460 miles, for above 300 of which, viz. from Cracow, it is navigable. The Bromberg canal connects the Vistula with the Oder. The Vistula becomes navigable by large barges at Cracow; the Narew, at Tykoczin; the Bug, which is joined by the Narew at Sierock, up to Brzesc Littewski; the Bober, which falls into the Narew, up to Goniondz, and the Wïeprz up to Kranistau. Higher up than the above-named places on the Bug and the Vistula the two rivers are navigable only by boats that go down the stream, but do not return. These are square flat-bottomed boats, and are called galleys or 'bicks;' they carry seven, eight, and up to fifteen hundred cwt. For these boats the Bug is navigable up to Dubienka, and the Vistula up to Cracow, but only when these rivers are swollen, as is the case in the spring, at midsummer, and in the autumn; at other times they cannot perform these voyages, and the period of high water at the above seasons is taken advantage of with as little loss of time as possible. The galleys are generally sold very cheap at Danzig. The Vistula being connected with so many navigable rivers, is a great channel for the conveyance of the productions of Poland, especially corn and timber, from the interior of the kingdom to the sea-coast. At the junction of the Bug and the Vistula stands the important fortress of Modlin; at Warsaw the river is commanded by Alexander's citadel.

(Hassel, *Das Russische Reich in Europa*; Stein, *Geographisch-Statistisches Lexicon*; Brockhaus, *Conversations Lexicon*.)

VISUAL, that which accompanies vision: as, the visual angle, under which a body is seen; the visual rays by which it is seen, &c.

VITA'CEÆ, or VINI'FERÆ, a natural order of plants belonging to Lindley's albuminous group of Polypetalous Exogens. The species of this order are composed of sarmentose and climbing shrubs, and hence the order is sometimes called Sarmentaceæ, of which the grape-vine is the type. Kunth has named the whole order Ampelideæ, from *ámpelos* (ἄμπελος), the vine. Jussieu, in the first edition of the 'Genera Plantarum,' called this order Vites. The calyx is small, with an entire or toothed margin. The petals 4 or 5, inserted on the outside of the disk, turned inwards at the edge in æstivation in a somewhat valvate manner, and the apex often inflexed. The stamens are equal in number to the petals, and placed opposite them, sometimes sterile by abortion; the filaments are distinct, or slightly cohering at the base; the anthers ovate and versatile. The ovary is superior, 2-celled; the style single, very short; the stigma simple; the ovules definite and erect. The fruit a globose berry, younger ones 2-celled, older ones frequently 1-celled by abortion. Seeds 4 or 5, or fewer; albumen hard; embryo erect, half the length of the albumen; the radicle terete; the cotyledons lanceolate. The lower leaves are opposite, and the upper ones alternate, stalked, simple, lobed, or compound, furnished with stipules at the base. The peduncles are racemose, thyrsoid, corymbose, cymose or umbellate, opposite the leaves, and re sometimes changed into tendrils. The flowers are mall, insignificant; the colour greenish or greenish yellow, ometimes purple.

The order thus constituted has been variously placed by otanists. On account of its albuminous seeds, Lindley laces it in his group Albuminosæ. With many orders in is group it has affinities. It has acid properties, in common with Grossulaceæ and Berberaceæ. Its affinities to Umbelliferæ may be seen through the species of Cissus nd Leea; and Vitis has a strong resemblance to Aralia, specially A. racemosa. The tumid and articulated joints of itaceæ, with other points of resemblance, exhibit a relaon with Geraniaceæ.



Vitis vinifera.

1. Cutting, with a bunch of fruit; 2. inflorescence; 3. transverse section f berry in young state; 4. vertical section of the same; 5. section of ripe ruit; 6. section of seed, showing embryo.

This order includes 6 genera, which for the most part inhabit the warmer parts of the northern temperate zone, and are found in both the Old and New worlds. Most of them are natives of Asia, one of New Holland, and none in Europe. The most characteristic property of this order is acidity, which is most fully developed in the grape-vine. [VITIS.] The acid present is chiefly the tartaric, but malic acid has also been found. In addition to the acid, sugar is present in the fruit, which is of a peculiar kind, and is called grape-sugar. Some of the species of *Cissus* are used in medicine. This genus is known by its nearly entire calyx, 4 petals, 4 stamens, 4-celled ovary, and 1- to 4-seeded berry. Some of the species, as C. cordata and C. setosa, have acrid properties, and are used by the natives of Hindostan as an external application for indolent suppurating tumours. The berries of most of the species are too acid to allow of their being eaten, but those of C. ovata, a native of Jamaica and the West Indian Islands, are eaten by the natives. The roots of C. salutaris, a native of New Andalusia, are employed as a remedy in dropsy. All the species are climbing plants, and some of them are supplied with remarkable hooked tendrils, by which they lay hold of the branches of trees, and thus elevate themselves above their summits. In cultivation they require the same general treatment as the grape-vine, but are seldom seen in this country except in botanical collections.

The genus *Ampelopsis* has a nearly entire calyx, 5 petals, 5 stamens, a single style crowned by a capitate stigma, the ovary not immersed in the disk. This genus is intermediate between Cissus and Vitis. The species are found in North America, the north of Africa, in China, and the Himalaya. They are all climbing shrubs, of easy propagation and culture, and are very ornamental. The *A. hederacea* is the 5-leaved or American ivy. It has been long known in the gardens of Europe. It is a native of North America, from Pennsylvania to the Carolinas. It is known by its digitate leaves with 5 leaflets. It grows freely in cities, and often runs up in the front of houses in and near London to the height of 50 or 60 feet. The leaves are a lively green in summer, and in autumn change to a bright red. Several other species bear cultivation in the open air in this climate, but none are more worthy of attention than the above.

The genus *Leea* was named after James Lee, the founder of the extensive nursery at Hammersmith, and author of an 'Introduction to the Linnæan System of Botany.' Together with the genus *Lasianthera*, it is distinguished from the other genera of the order by the possession of a monopetalous corolla, and by its peduncles never being converted into tendrils. On account of these differences Bartling has separated these two genera from Vitaceæ, and formed them into a small order with the name Leeaceæ. The species of Leea are large rough shrubs, with cymes of small greenish or yellow insignificant flowers, with pinnate or bi-pinnate leaves. They are not worth cultivating as ornamental shrubs.

(Lindley, *Natural System*; Bischoff, *Lehrbuch der Botanik*; Don's *Gardener's Dictionary*.)

VITALIA'NUS, a native of Signia, succeeded Eugenius I. in the see of Rome, A.D. 657. He sent envoys to Constantinople to signify his election to the emperor Constans II., called by some Constantine, who received them favourably and confirmed the privileges of the Roman See, and sent back the envoys with presents to Rome. Aribert I., son of Guntwald of Boioaria, and nephew of Queen Theudelinda, was at the time king of the Longobards, but the duchy of Rome bore allegiance to the Eastern empire, and was included in the administrative jurisdiction of the exarch of Ravenna. About the year 663 the emperor Constans landed at Tarentum with a large force, invaded the duchy of Beneventum and laid siege to that town, whose duke, Grimwald, had gone to Pavia, where he had by treachery seized the crown of the Longobards. Grimwald, who had left his son Romuald as duke of Beneventum, upon hearing of the invasion of the Byzantines hastened to relieve Beneventum, when Constans was obliged to raise the siege and withdraw to Naples, from whence he repaired to Rome. Vitalianus went at the head of his clergy to meet the emperor outside of the walls, and conducted him to St. Peter's church. Constans afterwards visited the Lateran and the other principal churches of Rome, and after remaining twelve days in that city he returned to Naples. But before he left Rome he ordered the principal monuments of the city to be stripped of their bronzes and other ornaments, and the Pantheon among the rest, not sparing even the external bronze covering of the dome. The booty was shipped for Syracuse, whither Constans repaired, and where he intended to fix his residence. Most of the bronzes were afterwards seized by the Saracens when they plundered Syracuse.

In the year 666 a controversy took place between Vitalianus, and Maurus, archbishop of Ravenna, who refused to acknowledge the supremacy of the see of Rome, and to receive the pallium from the hands of its bishop. Vitalianus summoned Maurus to Rome under pain of excommunication, and the archbishop retorted by sending him a letter in which he anathematized Vitalianus. Both Vitalianus and Maurus appealed to the emperor Constans, who by a diploma, dated Syracuse, on the Calends of March, in the year xxv. of Constantine the elder, emperor, decreed 'that the church of Ravenna should be ever after independent of every other ecclesiastical authority, and especially of that of the patriarch of old Rome, and should enjoy the privilege of being Autocephalus,' and he condemned the [illegible] his having written to that [illegible] to the [illegible]. Muratori quotes the [illegible] which he found in the library of Modena.

In the year 668 Vitalianus consecrated Theodore of Tarsus as archbishop of Canterbury, and sent him to England with instructions to establish and enforce unity of discipline in the churches of Britain, an object which Theodore effected, though not without much difficulty, at the council of Hertford, A.D. 673.

In the year 672 Vitalianus died at Rome, and was succeeded by Deodatus or Deusdedit II.

(Muratori, *Annali d' Italia;* Platina, *De Vitis Pontificum;* Agnellus, *Liber Pontificalis.*)

VITEBSK. [VITEPSK.]

VITE'LLIUS, AULUS, a Roman emperor, whose reign lasted little more than ten months, A.D. 69. He was of a noble family, and his father Lucius Vitellius had been honoured several times with the consulship (A.D. 34, 43, and 47), and afterwards appointed praefect of Syria. He was a man of effeminate and luxurious habits, and his son Aulus inherited these qualities from his father: he was also prodigiously fond of the pleasures of the table. His manners were probably pleasing, as he enjoyed the favour of three successive emperors, Caligula, Claudius, and Nero. He was first made consul in A.D. 48. After Galba had been elevated to the imperial dignity, in A.D. 68, he ordered Fonteius Capito, the commander of the legions in Germany, to be put to death, and appointed Aulus Vitellius in his stead. Galba was unpopular with the soldiers, as he did not attempt to win their favour by rich donatives: Vitellius, on the other hand, was the idol of his troops, whom he attached to himself by liberal gifts, and by still more liberal promises; and at the beginning of the year A.D. 69, Vitellius was proclaimed emperor. On the arrival of this news at Rome, Galba adopted L. Piso Licinianus, a noble and unassuming youth; but the praetorians were discontented with Galba's stinginess, and a conspiracy was formed against him, which was headed by L. Salvius Otho Titianus, who was himself proclaimed emperor by the soldiers, and ordered Galba and his friends to be put to death (January 15th, 69). The Roman empire had now two emperors, whose rival claims could only be settled by the sword. Vitellius sent two of his generals to occupy the Pennine Alps and the part of Italy north of the Po (Gallia Transpadana). Otho marched against them, and met the enemy near Bedriacum; but his army being defeated, he despaired of success, and put an end to his life about the middle of April. His army recognised Vitellius as emperor, who now came to Rome. He had scarcely arrived there when Flavius Vespasianus, who was then engaged in the war against the Jews, was urged by his friends to assume the imperial dignity, and was actually proclaimed emperor on the 1st of July, at Alexandria, by Tiberius Alexander, the praefect of Egypt. Vespasian was immediately recognised by the legions in Judaea and Syria, and soon afterwards also by those of Moesia and Pannonia. Antonius Primus, the commander of the latter, marched into Italy without waiting for the commands of Vespasian. The defensive plans of Vitellius were betrayed by his own general Caecina; and his army, though far superior in numbers to that of the enemy, was routed in an engagement which took place during the night between Bedriacum and Cremona. His camp near Cremona was taken by the enemy, the soldiers surrendered, and Cremona was burnt. The victorious army slowly advanced towards Rome: the garrisons stationed in the various towns on their road surrendered at the approach of Antonius, and Vitellius at Rome, wavering between fear and hope, could not come to any resolution, but allowed his adherents to act as they pleased. On the arrival of the hostile army in the city, and during the civil bloodshed which ensued, Vitellius concealed himself: but he was dragged from his hiding-place and murdered at the age of 57. His body was thrown into the Tiber. This was about the end of December, A.D. 69. His brother Lucius Vitellius was likewise put to death, and the rest of his adherents surrendered.

(Suetonius, *A. Vitellius;* Tacitus, *Historiæ;* S. Aurelius Victor, *De Cæsar.* 8; Eutropius, vii. 12.)

VITELLO, commonly, but incorrectly, **VITELLIO**, was a native of Poland, and was commonly thought to have lived in the tenth century, till it was shown, from his own work, that he lived in the thirteenth. He wrote his work on optics near Cracow, as is supposed; but it appears that he had lived some time in Italy. Nothing more is known of him except some unimportant facts relative to his family, which may be found in the 'Biographie Universelle.'

There are said to be works of Vitellio remaining in manuscript, but the only one which has been printed is that on optics, which has had three editions. The first was 'Vitellionis Perspectivæ Libri Decem,' Nürnberg, 1533, in folio, edited by Tanstetter and Apian. The second, 'Vitellionis Mathematici Doctissimi de Optica, &c., Nürnberg, 1551, folio. The third, 'Optice Thesaurus Alhazeni, &c. Item Vitellionis Thuringo-Poloni Libri Decem,' Basle, 1572, folio, edited by Risner. This work is admitted, by all who have consulted it, to show a profound knowledge of the ancient geometry. Montucla and the Libes say that in optics it is little more than a translation of Alhazen; this is wholly denied by the writer of the Life in the 'Biographie Universelle,' who does not however give any information on the points in which the two authors differ, and does not precisely specify the points in which he considers Vitellio to have augmented the existing knowledge of optics. But Libes asserts that Vitellio distinctly attributes the rainbow to combined reflexion and refraction; as also that he accounts for the luminous rings which are seen round the sun and moon by the refraction of light in haze or vapour, and for parhelia, &c. by reflexion from clouds. Dr. Young states his theory of refraction to be more correct than that of Alhazen, and refers to him as the constructor of an original table of refractive powers.

VITEPSK, or **VITEBSK**, is a government in the north-west of European Russia, and with that of Mohilew is the part of Poland which fell to Russia at the first partition of that kingdom in 1772. Catherine II. divided it into two governments, which she united in 1796 under the name of White Russia; but in 1802 it was again divided into two, when Vitepsk was organised as at present. It lies between 54° 42′ and 57° 21′ N. lat. and 25° 45′ and 31° 50′ E. long. and is bounded on the north-west by Livonia, on the north-east by Pskow, on the east by Smolensk, on the south-east by Mohilew, on the south-west by Minsk, and on the west by Wilna and Courland. Its area is [illegible] square miles, and it is divided into twelve circles.

This government is a vast plain without mountains and almost without hills, diversified only by the banks of the rivers, which rise a little above the general level. The soil is sand mixed with clay, and with a very thin covering of vegetable mould. The principal river is the Düna,* which enters the government from Pskow, makes a semicircular bend to Desna, from which place it runs along the western frontier, and is joined in its course by most of the rivers of the province: among these are the Mesta, the Kasplia, the Ula, the Polota, the Drissa, the Druja, the Saryja, the Feananka, and the Ewest. There are numerous small lakes, but not one of any considerable size: the largest are that of Lubahn or Luban, towards the north on the frontier of Livonia, and the Urmyn, Usmiat, Neveshe, Szelai, Sebesh, Lizno, Osweija, and Razna, about the centre. The abundance of water causes the climate to be rather damp, but it is temperate and not very variable.

Though the soil is poor, and needs much manure and periodical fallow, agriculture is the chief occupation of the inhabitants, and, on account of the facility of exportation, very profitable. They cultivate rye, wheat, barley, oats, and some pulse, but the last only on the lands of the nobles; flax and hemp are grown in great abundance; hops only in small quantities. Horticulture is pretty well attended to, and the gardens both of the peasants and nobles furnish the vegetables common in Russia, but there is no fruit except cherries, because apples, pears, and plums require too much care. The bird-cherry is very common, as well as all sorts of wild berries (bilberries, cranberries, &c.), and these supply the want of stone-fruit. The immense forests, consisting both of pines and other timber trees, afford ample employment to the inhabitants in felling and squaring timber: 'yet,' says Hassel, 'no potash is made, nor is any pitch or tar boiled for exportation.' The pasture lands are very extensive, and horned cattle and horses are bred in great numbers, but the former are small; the horses are partly of the strong Russian race and partly of the lighter Polish breed. There are large flocks of sheep, the wool of which is coarse. The inhabitants have abundance of goats, swine and poultry, and bees; but the honey is f bad quality. In the forests there are bears, wolves, oxes, stags, wild boars, flying squirrels, hares, and ame. The lakes and rivers produce various kinds of fish, specially smelts, of which immense quantities are dried nd exported. The minerals are iron-ore, freestone, lime, narl, and fullers'-earth.

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* This river is called by the Russians and Poles Dwina; and it is only in Courland and Livonia, as well as in Germany, that it is called Düna; yet the latter name seems preferable, to prevent its being confounded with the Dwina which falls into the White Sea near Archangel.

It may be almost said that there are no manufactures: 1808 there was not one of any kind; the official table or 1828 mentions thirty-nine, of which only four were f woollen cloths, one of earthenware, one of glass, one of andles, and thirty-one tanneries; in 1831 only twenty-ght are enumerated, and these had altogether but 182 orkmen.

The commerce of the government is greatly facilitated the Düna, by which all its surplus produce is conveyed light boats to Riga and Pernau; hemp is sent in edges to St. Petersburg, and dried smelts (called snetki) the neighbouring governments. Greater facilities ve been given to commerce by the Berezina canal, which nnects the Düna and the Dnieper. The principal arties of export are hemp, dried fish, corn, flour, bristles, orses, square timber, masts, linseed, flax, oxen, wool, des, tallow, honey, and wax.

The population is probably near 940,000, but authors ffer very considerably in their statements. One reason this may be that the great majority are Rusniaks, who elong either to the Roman Catholic or United Greek urch, and, acknowledging the pope, are not noticed in e publications of the Synod of the orthodox Russian urch. The orthodox Russians are few in number; the ergy and the nobility are chiefly Poles. Next to the isniaks, the Lettonians are the most numerous; the ws are about 15,000, and there are some hundreds of gyps and Germans. The Roman Catholics are under the archhop of Mohilew; they have sixty-three parishes and ty convents: the United Greeks are under the bishop Polotzk, and have one hundred and thirty-five churches d thirty-three convents. The orthodox Greeks, who are nost all Great Russians, have sixty-five parishes, and are der the bishop of Mohilew. The Lithuanians, Lettoans, and Germans are mostly Protestants. The Jews ve their synagogues and schools.

With respect to education, Schnitzler says he cannot e a general account for want of information respecting e schools of the Roman Catholic clergy, and also of ose of the Greek clergy, which are united with those of e whole diocese of Mohilew: but he gives the following te of the lay-schools at two different times:—

	Schools.	Masters.	Pupils.		Girls.
1826	19	85	1110	of whom	23
1832	24	94	971	,,	130

t must be observed that the government had at that e three gymnasia, a lyceum, and seven private estahments, whence it may be inferred that public education not neglected. There is however no printing-office ept the two belonging to the crown.

I. Krusenstern says that the number of pupils in the ernment of Vitepsk was, in 1824, 1133; in 1832, 971; l in 1835, 1262.

Vitepsk, the capital of the government, to which it es its name, is situated on the Düna, at its confluence h the Viteba, in 55° 6′ N. lat. and 30° 5′ E. long.

The name of Vitepsk is mentioned by Constantine Poryrogenitus in the tenth century, though, as he places city on the Dnieper instead of the Düna, he seems to ve had in view a different place from the present Visk, which however appears to have been in existence at t time. The town is surrounded with antient walls and ers. It is built on both banks of the Düna. The part the left bank is the most considerable: beyond the eba is the old castle, surrounded with a very lofty ramt, and the handsomest buildings. The streets are on whole narrow and irregular, and there are only a few ne houses. One of the finest edifices is the convent of eek monks of the order of St. Basil. There are fourteen urches; eight monasteries, of which six are Roman holic and two Greek; and two nunneries. Vitepsk many hospitals, poor-houses, and orphan-asylums, and rge bazaar. Of the four manufactories of woollenth mentioned above, three are in this city: there are eral tanneries, but no manufactories of any importance. nost the whole commerce of the government is in the nds of the merchants of Vitepsk: it is chiefly with Riga, Memel, Danzig, and St. Petersburg; with the three last places by means of the Düna, which becomes navigable at Vitepsk.

Welisch (in Polish, *Wieliz*), a town with 6800 inhabitants, of whom 1000 are Jews, situated on the two banks of the Düna, has a considerable trade in the produce of the country. The public buildings are one Roman Catholic and eight United Greek churches, a synagogue, and a citadel.

Polotzk is mentioned in the antient Scandinavian traditions anterior to Rurik, who sent thither one of his companions in arms to govern in his name. The present city is far from being what it was formerly. It is fortified, but the fortifications are of little importance, and the citadel has fallen into decay. There are three United Greek churches, two Roman Catholic convents of the Dominicans and Franciscans, one United and one Greek convent, one Lutheran chapel, a synagogue, and an hospital. The handsomest building in the town is the former college of the Jesuits, with a beautiful church. Population 10,000. The other towns, capitals of the several circles, do not require any particular notice.

(Schnitzler, *La Russie, la Finlande, et la Pologne*; Hassel, *Das Russische Reich in Europa*; Stein, *Geogr. Lexicon*; Hörschelmann, *Handbuch der Geographie*.)

VITERBO E CIVITAVECCHIA, DELEGAZIONE DI, a province of the Papal State, situated between the Tiber, the sea, and the frontiers of Tuscany. It is bounded on the south by the comarca or administrative province of Rome, which extends on both banks of the Tiber; on the east partly by the same and partly by the province of Spoleto, from which last it is separated by the bed of the Tiber; on the north partly by the province of Perugia, from which it is separated by the river Chiana, and partly by the Tuscan province of Siena; and on the west partly by the Tuscan province of Grosseto and partly by the Mediterranean Sea. The eastern part of the province lies in the basin of the Tiber; the central part consists of the basin of the lake of Bolsena, and its outlet the river Marta; and the western part consists of the lower valley of the river Fiora, which, after rising in the Tuscan territory, enters the Papal State, and after a course of nearly 50 miles enters the sea below Montalto. These three basins or valleys slope southwards towards the sea, and merge in the unhealthy maritime plain of the Maremma, which extends along the sea-coast.

The ridge called Cimino, the antient Ciminus, of volcanic formation, runs from north to south for a length of about 30 miles, from Monte Soriano, north-east of Viterbo, which is its highest summit, being 4000 feet above the sea, to Monte Virginio near the lake of Bracciano, and divides the basin of the Tiber from that of the lake of Bolsena. The Ciminus and its impervious forest arrested for many years the progress of Roman conquest on the side of Etruria. The Cimino, which is still a well-wooded and picturesque mountain, is crossed between Ronciglione and Viterbo by the high road from Rome to Florence. A succession of lower hills encloses the lake of Bolsena on three sides, leaving an opening to the southward, through which flows the river Marta. [Bolsena, Lago di.] On the south-east, between the lake and the ridge of Cimino, is a wide plain, at the south-eastern end of which is the town of Viterbo.

Viterbo, the capital of the province and a bishop's see, and the residence of the delegate or governor, is pleasantly situated at the northern base of the ridge of Monte Cimino, which is here vulgarly called Montagna di Viterbo, and on the high road from Rome to Florence, and 40 miles north-west of Rome. Viterbo lies about 1000 feet above the sea. It is a large though not very populous town, enclosed by walls and towers; it has more than [illegible] churches, several convents, and other considerable buildings; the streets are well paved and adorned with handsome fountains. The cathedral is adorned with some good paintings, and with the monuments of several popes who during the middle ages made Viterbo their residence, being driven out of Rome by the [illegible] common in those times. The [illegible] to the cathedral is of the [illegible] the great hall where the [illegible] of Nicholas III., A.D. [illegible] without being able to [illegible] pope. At last Charles [illegible] also senator of Rome [illegible] pope, persuaded the people and the municipal authorities of Viterbo to starve out the cardinals, and even to take away the roof of the building, in order to oblige them to hasten the election, which took place at last in the person of Simon de Brie, a French cardinal, who assumed the name of Martin IV. In another apartment of the same palace Pope John XXI. was killed by the falling in of a wall, A.D. 1277. The other churches worthy of notice are—1, Santa Rosa, where the body of the saint is preserved, dried up like a mummy. Rosa was a young female enthusiast of the thirteenth century, who was set up as a leader of the Guelph party against the emperor Frederic II. She is the patroness of Viterbo, and a yearly festival takes place in her honour, in the month of September, when numbers of people flock to Viterbo to visit her sanctuary. 2, The church of Santa Maria della Verità, outside of the walls, has a very good fresco painting, which has been little noticed, representing the 'Sposalizio,' or Marriage of the Virgin Mary, by Lorenzo di Giacomo of Viterbo, a pupil of Masaccio: he is said to have worked at it for a number of years, and to have introduced in it the portraits of the principal contemporary persons of Viterbo. 3, S. Angelo in Spata has a Roman sarcophagus with a basso-rilievo, and a modern inscription, which says that it was used as a sepulchral urn for the fair Giuliana, an historical character of the twelfth century, who is said to have been the cause of one of the frequent wars in those ages between the people of Rome and those of Viterbo, in which the Romans were defeated.

The communal or town palace, begun in the thirteenth century, has some good paintings by Romanelli and Cavarozzi, both natives of Viterbo, and a collection of Etruscan sepulchral monuments and other antiquities. The old palace of the Farnese family is now a foundling hospital.

Viterbo is, after Rome, the largest town of the Southern division of the Papal State. Its population is about 13,000. (Calindri, *Saggio Statistico dello Stato Pontificio.*) It is said to have been built, or rather enclosed, by Desiderius, the last king of the Longobards, and to have been peopled by the inhabitants of several ruined towns of the neighbourhood. It governed itself for a long time during the middle ages as a free municipality, was often at war with the people of Rome, to which it was obliged at last to make its submission about the year 1200, and to deliver up to the Romans its great bell and the iron chain which served to fasten its principal gate. In the fourteenth century it had its petty native tyrants, first of the family of Gatti, and afterwards of the family of Vico. Giovanni Vico, being defeated in 1354 by Albornoz, the papal legate, gave up Viterbo to the pope, and was made governor of Corneto. [ALBORNOZ, GIL CARRILLO DE.] During the French revolutionary invasion of 1798, Viterbo revolted against the invaders, and the people seized a number of French civil and military officers, who were rescued from the popular fury by the exertions of the bishop and of some of the nobility of the place.

The population of Viterbo and its neighbourhood are supported chiefly by agriculture; wine and oil are the principal produce of the country. There are however some manufactures of common woollens. Many of the landed proprietors and local nobility reside at Viterbo.

At Bagnaia, not far from Viterbo, is the Villa Lante, belonging to the Roman family of that name, a delightful residence, with terraces, gardens, and waterfalls. The palace S. Martino, belonging to the Doria family, in the same neighbourhood, was once the residence of D. Olimpia Maidalchini, the powerful sister-in-law of Pope Innocent X. Her portrait and several articles of her toilette are preserved in the palace. To the east of Bagnaia is Soriano, a small town of 2700 inhabitants, which is an estate of the Albani family, who have a mansion on the summit of a cliff commanding a splendid view over the range of the Cimino and the valley of the Tiber. In the plain between the Cimino and the Tiber, and not far from Orta, the antient Horta, now a town of 1800 inhabitants, is the small lake of Bassano or Bassanello, the antient Vadimonis, on the banks of which the Etruscans were defeated by the Romans, B.C. 308. At Orta are seen the remains of a fine antient bridge on the Tiber, which the people call Ponte di Augusto. In the same plain is Vitorchiano, a town of 1400 inhabitants, known for its having been in the middle ages a faithful ally of Rome against the people of Viterbo. To the northward, on a ridge of calcareous hills which intervenes between the lake of Bolsena and the Tiber, is the town of BAGNORIA; and six miles farther north, on a steep hill of volcanic formation near the confluence of the Paglia with the Tiber, is the town of ORVIETO. Ascending the valley of the Paglia, to the westward we find the town of ACQUAPENDENTE near the borders of Tuscany.

On a conical hill which rises to the south-east of the lake of Bolsena is Montefiascone, said to have been once a town of the Falisci; it is now a bishop's see, has [illegible] inhabitants, and is chiefly known for the excellent muscat wine which is made in its territory. The cathedral of Montefiascone, and the church of San Flaviano, built in the eleventh century, are worthy of notice. The latter contains the sepulchre of John de Fugger, a German bishop, who died in this place from having drunk too much of the muscat wine; so at least says the local tradition, supported by the received interpretation of his epitaph.

South of Viterbo, and on the high road to Rome, is Ronciglione, built on a bed of lava at the southern base of the Cimino, and on the border of the great plain of the Campagna. It has about 4000 inhabitants, and iron and copper works and paper-mills. Near Ronciglione, in a romantic valley (once a crater) of the Cimino, is the pretty lake of Vico, surrounded by thick woods. An emissary, constructed by the Farnese dukes of Castro and Ronciglione, carries off the superabundant water, which, flowing through a narrow ravine, sets in motion a number of mills. Farther on, and on the northern slope of the Cimino ridge, overlooking the valley of the river Marta, is the small town of Bieda, the antient Blera, mentioned in the history of the incursions of the Longobards against Rome. Farther north, and on the same ridge, is Vetralla, a town of about 3000 inhabitants. On the opposite or southern slope of the Cimino, and a few miles from Ronciglione, but out of the main road, is the decayed town of Sutri, with about 1500 inhabitants, the antient Sutrium, having a large amphitheatre cut in the rock, with six ranks of seats, in very good preservation, believed to be the work of the Etruscans previous to the Roman conquests. There are also tombs cut in the rock, like those of Tarquinii. The modern town of Sutri is often mentioned in the history of the popes during the middle ages. About five miles east of Ronciglione is Caprarola, a town of 3000 inhabitants, celebrated for the magnificent country-residence of the Farnese family, built by Vignola. The apartments are painted with historical subjects by the brothers Zuccari. The gardens, laid out on the slopes of the Cimino, are in the Italian architectural style, with marble terraces, flights of steps, balustrades, fountains and statues, presenting a grand and imposing scene. Caprarola now belongs to the king of Naples as heir of the Farnese.

South-east of Caprarola, towards the Tiber, is Civita Castellana, a bishop's see, and a town of 2300 inhabitants, in a strong situation, with a regular fortress built by Julius II. A viaduct of two ranks of arches carries across a deep ravine the high road leading from Rome to Narni, Terni, and Spoleto, which was made by Pius VI. The antient walls of Falerii are seen in good preservation at a short distance from Civita Castellana. They are made of large volcanic stones without cement, and are above [illegible] feet high in some parts. The place is a desolate wilderness, and is called Santa Maria di Faleri, from a church built in its enclosure in honour of the Virgin, but which has been long since in ruins. (Tournon, *Etudes Statistiques sur Rome.*) South-east of Civita Castellana rises in the middle of the plain of the Tiber, the insulated mountain of Sant' Oreste, the Soracte of the antients, 2500 feet high, abrupt and naked. The mountain is of the same calcareous stone as the mountains of the Sabinum on the opposite or eastern bank of the Tiber. In antient times Soracte had a temple dedicated to Apollo. Afterwards a Christian monk or hermit of the name of Orestes went to reside on the mountain, where he built a convent, and gave it his name. Carloman, son of Charles Martel, and elder brother of Pepin le Bref, Charlemagne's father, being weary of the world, resigned his government of Austrasia about A.D. 745, went to Rome on a pilgrimage, and, lastly, retired to the convent on Mount Soracte, where he died.

A few miles south-west of Civita Castellana, on the high road to Rome, is the small town of Nepi, the antient

Nepete, a town of the Etruscans, and afterwards a Roman colony. In the middle ages Nepi was a duchy belonging o the Colonna family. It is now a poor place, with about 1500 inhabitants.

The basin of the lake of Bracciano, which discharges its water into the sea through the river Arrone, is included in he boundaries of the comarca or province of Rome. Bracciano, Lago di.] West of the lake of Bracciano is a ridge which is a lower projection of the Cimino, and upon which is the town of La Tolfa, with 2200 inhabitants, and a manufacture of alum, which is extracted from he neighbouring rocks. A few miles west of La Tolfa, on the sea-coast, is the town of Civitavecchia, the principal, we might say the only port of the Papal state on the Mediterranean.

Following the coast northward of Civitavecchia, we find Corneto on the river Marta, about two miles distant from he sea. Its high walls, towers, and spires give the town an imposing appearance, but it is deserted during the summer months on account of the malaria. In winter it eckons between 3000 and 4000 inhabitants. Its territory produces abundance of corn, pulse, and hemp, and numeous herds of cattle feed in the wide pasture-grounds. The ystem of cultivation of the large farms of this region is noticed under Campagna di Roma. On the coast near Corneto are extensive 'saline,' or salt-pans, in which some hundreds of galley-slaves are employed. Shelter is aforded to coasting vessels by a mole, which encloses a ind of artificial harbour called Porto Clementino. About en miles inland north-east of Corneto is the town of Toscanella, near the river Marta, with about 3000 inhabitants, most of whom leave their houses in the summer months. Toscanella was a town of some importance in the middle ges; it was taken by storm by Charles VIII. of France, n his hurried retreat from Naples, A.D. 1495, and was plunered. In a glen near Toscanella are many sepulchres cut n the rock, but Micali doubts their belonging to the Etruscan times. The antient Tuscania was however in this eighbourhood.

Near Corneto are the ruins of Tarquinii, one of the principal towns of Etruria. Its interesting remains, as well as hose of Vulcia near Canino, of Axia near Viterbo, and of other Etruscan towns with which the country was once trewed, are noticed under Etruria and Etruscan Architecture. About eight miles north-west of Corneto is Montalto, a village with about 500 inhabitants, situated on the iver Fiora, near the sea, in a plain fertile in corn and pasures. Large flocks of Merino sheep graze here in the winter. The sea-coast is lined with thick forests interspersed with marshy pools. Numerous herds of pigs feed n the forests. A few miles north of Montalto, near the anks of the Fiora, is the site of the ruined town of Castro. Innocent X.] To the east of Castro is the village of anino, a fief of Luciano Bonaparte, who has discovered umerous Etruscan remains in the neighbourhood.

A ridge of hills, which is an offset of the Tuscan group f Montamiata or Santa Fiora, rises on the east of Montlto, and running to the northward divides the valley of he Fiora from the basin of the lake of Bolsena. On these ills is Valentano, with about 2000 inhabitants, and in the eighbourhood are the villages of Ischia and Farnese, from he last of which the princely family which was once overeign of Castro and of Parma derived its name.

The united province of Viterbo and Civitavecchia is ltogether one of the most important and interesting n the Papal state. It formed part of antient Etruria. n the middle ages it formed part of the extensive dominions of the famous Countess Matilda, who bequeathed it to the see of Rome, and it was then called by he name of 'Patrimonio di San Pietro.' In course of ime it was divided into two administrative provinces, Viterbo and Civitavecchia, until Pope Leo XII., by a new organization which he decreed in 1824, united the two nto one province, adding to it the small district of Orvieto, which was formerly included in the division of Umbria. The united province of Viterbo and Civitavecchia contains 16 'città,' or walled towns, and 72 'terre,' or towns having a communal council, besides villages and hamlets. The population amounted in 1833 to 157,519 inhabitants.

(Serristori, *Statistica dell' Italia*; Calindri, *Saggio Statistico dello Stato Pontificio*; Tournon, *Etudes Statistiques ur Rome et la Partie Occidentale des Etats Romains*; Valéry, *Voyages en Italie*.)

VITEX, a genus of plants of the natural family of Verbenaceæ, which is so named from the suppleness of the twigs of the principal species, which was well known to the antients, being a native of the south of Europe; the other species are found in India and its islands, China, and a few in the New World. The genus is characterized by having a short campanulate 5-toothed calyx. The corolla is irregular, somewhat labiate, divided into 5 lobes. Stamens 4, didynamous, inserted into the corol. Ovary superior, roundish; style the length of the stamens; two pointed and diverging stigmas. The fruit is a globular berry, a little hard, with its base covered by the calyx, and divided into four single-seeded cells. *Vitex agnus castus*, the longest-known species, and a native of the south of Europe, has digitate leaves of 5 or 7 nearly entire leaflets, something resembling those of the hemp-plant, and it forms a shrub of about 12 feet in height. The flowers are arranged in spiked whorls, and have an agreeable fragrance. The fruit is globular, rather smaller than black pepper, with an acrid and aromatic taste, whence it is called *petit poivre* and *poivre sauvage* in the south of France. It was well known to the antients, and forms the Piper agrestis of some authors. In India the fruits of the species *V. triphylla* and *Negundo*, which are indigenous there, have the same properties ascribed to them, and are called *filfil burree*, wild pepper. The antients considered the Vitex antiaphrodisiac, but the berries, from their warm aromatic taste, must be possessed rather of stimulant properties. The leaves of the Indian species are mucilaginous and demulcent, and are much employed as cataplasms, emollient fomentations, and medicated baths. The leaves of the European species must have similar properties, and probably gave origin to the idea of the fruits being similar in effect. They were strewed upon beds, and supposed to preserve chastity. Some of the species which attain considerable size in hot countries, as Vitex altissima and V. arborea, yield valuable timber; that of the latter is chocolate-coloured and very hard. The author of this article was at one time inclined to think that the Vitex agnus castus might be the mustard-tree of the New Testament, as it has acrid-tasted berries with small seeds, is called wild-pepper, and grows to the height of 12 feet. It has sometimes been confounded with Elæagnus angustifolia, from some of the antients having called it Elæagnus.

VITIS, a genus of plants, the type of the natural order Vitaceæ. It possesses the following characters:—Calyx usually 5-toothed; petals 5, cohering at the top, resembling a calyptra, separating at the base and deciduous; 5 stamens; style none; berry 2-celled, 4-seeded; cells and seeds often abortive. The species are climbing shrubs, with simple lobed, cut or toothed, rarely compound leaves, and thyrsoid racemes of small greenish-yellow flowers. Don, in the 'Gardener's Dictionary,' gives descriptions of forty species of the genus Vitis. They are found principally in Asia and America.

The best known of the species of Vitis, and perhaps one of the most extensively cultivated and useful of plants, is the *Vitis vinifera*, the Common Vine or Grape-Vine. It is characterized among the other species by possessing lobed, sinuately toothed, naked or downy leaves. A multitude of varieties of this plant have been recorded, both occurring wild and resulting from its very extensive cultivation.

Like most extensively cultivated plants, it is very difficult to ascertain of what country the vine is originally a native. It is among the plants of which we have the earliest records in the Books of Moses, and from which it appears to have been made use of in the same manner as at the present day. Although the vine is found in many places wild, it may still be doubted whether it is indigenous there, on account of its frequent cultivation. There can be little doubt of its being truly indigenous in the East, in the district between the Black and Caspian seas. In the forests of Mingrelia and Imiretia it flourishes in all its magnificence, climbing to the tops of the highest trees, and bearing bunches of fruit of delicious flavour. In these districts no cultivation of the vine exists, and the inhabitants seldom harvest the abundance of fruit that is produced. It is not probable that these vines are the remains of former vineyards, as plants mostly degenerate when they become wild after cultivation, which is not at all the case with these grape-vines. It is probable that the wild vines found along the borders of the Caspian Sea, [illegible] out Persia, in the north of China, and in the Deccan and Cashmere, are all indigenous, although the plant is cultivated in these districts. In many spots in France, Germany, Portugal, and Italy, the vine is found wild, but the fruit is very generally of an inferior kind, and it may be doubted whether it is truly indigenous in any parts of Europe. We have no accounts of the introduction of the vine into Greece; it was evidently cultivated there before the time of Homer, and is supposed to have been later introduced into Italy, and the Romans probably spread it through the north of Europe, and introduced it into Great Britain. Bede, writing in 731, says there are vineyards growing in several places. These vineyards in Great Britain were generally connected with monasteries, as the inhabitants of those places paid great attention to the cultivation of fruit. When monastic institutions were abolished, vineyards very generally disappeared in this country, probably both on account of their being no monks to attend to them, and better wine being obtained from the fruit of other countries. Much has been written about the re-introduction of vineyards into Great Britain. There can be no doubt that grapes could be produced in abundance, and acquire a certain degree of ripeness in this country; but our clouded skies and high latitude must prevent the production of fruit in this country equal to that of the lower latitudes and under the brighter skies of the continent of Europe.

The cultivation of the vine extends from near 55° north latitude to the equator, but in south latitudes it only extends as far south as 40°. It is cultivated at various elevations. In middle Germany it ceases from about 1000 to 1500 feet above the level of the sea. On the south side of the Alps it reaches 2000 feet; in the Apennines and Sicily 5000 feet; and on the Himalaya as high as 10,000 feet above the level of the sea. The point of the greatest importance in the ripening of the fruit of the vine is the length of the summer. Thus, although the maximum of summer heat is as great at Moscow as in Paris, yet the vine will not ripen its fruit in the former place, and this arises from the fact that although the greatest heat of the months of June and July are as great as that of Paris, the months of August and September are several degrees below. Nor will the mean temperature serve as a rule to indicate where the vine may be cultivated. England has a mean temperature as high as many parts of the world, where the vine flourishes in the greatest perfection; but it will be found that although England is warmer than these countries in the winter, it is not so warm in the months of September and October, at which time the vine is ripening its fruit. The vine will bear any degree of heat, and is cultivated in some districts close to the equator. It will not however bear heat combined with moisture, and the fruit in European countries is never so good in wet seasons. This then will account for the different points of latitude at which the vine ceases to be cultivated in Europe. In France it extends as far as 49° N. lat., on the western borders of the Seine. In England, although much cultivated, the fruit seldom ripens properly in the open air. At Berlin, in 53° N. lat., the fruit is poor. Königsberg has a north latitude of 54° 42′, and is the extremest point at which the vine can ripen fruit. On the Rhine its cultivation extends down to Cologne and even Düsseldorf. Throughout the middle and south of Europe to the borders of the Mediterranean, between the Black and Caspian seas, in Astrachan, in the north of China, in Hindostan, throughout Persia, along the borders of the Euphrates, in Syria, Lower Egypt, Abyssinia, and in Barbary, the vine is cultivated. In the New World, both in North and South America, the vine flourishes. In South America it is cultivated, and used for making brandy and wine at Guyaquil, Pisco, in the northern provinces of Chili, at Valparaiso, and is found at Valdivia, in the 40th degree S. lat. On the other side of the continent, at Buenos Ayres, and in various parts of Brazil, it is extensively cultivated. In North America its culture is known to extend as far as 37° N. lat., on the Ohio, and on the north-west coast as far as St. Francesco, in 38° N. lat. The vine is also growing now in the southern parts of New Holland, and has been introduced from America into the Sandwich Islands.

The fruit of the vine is used as an article of diet in several ways. Its agreeable sweet acid flavour when ripe has always rendered it a very desirable food when fresh. The antients also, there can be little doubt, were in the habit of drinking the expressed juice of the grape before fermentation. Grapes are also dried and used under the name of raisins. The drying is generally effected by cutting half through the fruit-stalk whilst they are suspended on the tree. Grapes thus dried are called Muscatel raisins, and are principally brought from Spain and the Levant. There is another dried grape used much in this country, called currants, or Corinths, but which are very different things from the common currant of our gardens and are the produce of a vine which grows in Zante and Cephalonia. Raisins and currants contain less water than fresh grapes, and when eaten alone they are liable to produce indigestion. The most extensive use of the grape is for the purpose of making wine. [WINE.] In an unripe state the juice of the grape contains malic, citric, and tartaric acids, bi-tartrate of potash, sulphates of potash and lime, with other inorganic salts in less proportion, a little tannin, and extractive matter. As the fruit ripens gum makes its appearance, and grape-sugar is formed at the expense probably of the citric and tartaric acids. When ripe the principal ingredients are sugar, gum, malic acid, and bi-tartrate of potash.

With its extensive cultivation, it is not to be wondered at that a great number of varieties should be described. The lists from the vineyards of the Continent and from the forcing-houses of England give several hundreds. In most of them the principal difference consists in the form and colour of the fruit, and the shape and clothing of the leaves. So great is the difference in some cases, that Professor Link of Berlin is of opinion that all our cultivated grapes are the products of the hybridization of several species. Independent however of any externally different characters, there is great variety observed in the wine which they produce, which depend on causes that have hitherto escaped observation. There are instances of the same variety of vine being planted on the side of a hill or mountain, and the wine which is the produce of the grape from the highest parts of the mountain will differ essentially from the wine which is the produce of the grapes of the lower parts of the mountain. The wines known by the names of Johannisberg and Rudescheimer in Germany are the produce of vines growing close together, and resembling each other in external characters. The vineyards also that produce the Leistenwein, Würzberger, and Steinwein are very near to each other. It is probable that this difference is owing to the composition of the soil.

Several attempts have been made to classify the varieties of the grape-vine, but not with much success. In most of the English and French catalogues the shape and colour of the fruit alone have been taken into consideration. Thus in Hervey's catalogue of the Luxembourg collection, which was published in 1802, there are 267 sorts named, of which 37 were vines with black oval fruits, 98 with black round fruits, 44 with white oval fruits, 73 with white round fruits, 5 with grey or violet oval fruits, 10 with grey or violet round fruits. Don de Roxas Clemente y Rubio, librarian to the Royal Botanic Garden at Madrid, has published an arrangement of Spanish vines, which also includes the consideration of the structure of the leaves, branches, &c. He divides the whole into two sections: the one with tomentose leaves, the other with pilose or nearly smooth leaves. As this is perhaps the best arrangement hitherto published, and proceeds on the principle of a natural classification, we shall give here the principal subdivisions, not giving the names of the vines, as they are probably little known or cultivated in this country.

Section I. Leaves tomentose.

Tribe 1. Forenses. Branches prostrate, long, and tender; leaves palmate, with the recesses cordate or subcordate; berries round, firm, sweet, and early.

Tribe 2. Fissiles. Branches prostrate, long, and tender; leaves palmate, with cordate recesses; berries black, soft, and sweetish.

Tribe 3. Pensiles. Branches firm, white, with long internodes; leaves lobed or palmate; berries firm and sapid.

Tribe 4. Duracinæ. Branches rather erect, brittle; peduncles woody; berries crowded, firm, with very thick skin.

Tribe 5. Helvolæ. Branches tender; leaves large, roundish, nearly entire or a little toothed, soft; berries large, round, very soft, and sapid.

Tribe 6. **Dapsiles.** Branches prostrate, long, tender; eaves small, dark-green; racemes rather cylindrical; berries crowded, soft.

Section II. Leaves pilose or nearly smooth.

Tribe 7. Ximeneciæ. Branches erect and horizontal; eaves acutely sinuated, greenish-yellow, rather pilose; berries rather crowded, middle-sized, white.

Tribe 8. Flaventes. Branches firm and brittle; leaves yellowish; berries crowded, middle-sized, roundish.

Tribe 9. Prostratæ. Branches prostrate, very tender; eaves yellowish; berries large, soft.

Tribe 10. Oxycarpæ. Leaves deep-green; berries middle-sized, round and large, oblong, rather acid.

Tribe 11. Pergulanæ. Branches prostrate; leaves greenish-yellow; berries rather crowded, round, firm, and apid.

Tribe 12. Bumasti. Berries large, ovately conical.

Tribe 13. Oleagineæ. Leaves deep green; berries middle-sized, and large, oblong, firm, austere, or very apid.

Tribe 14. Dactylides. Branches prostrate; berries obong, firm, and sweet.

Tribe 15. Apiana. Berries musky.

Of the varieties cultivated in hothouses in Great Britain, catalogues of between two and three hundred have been published. Although our climate does not permit of the grape attaining its greatest perfection in the open air, yet n the forcing system of cultivating grapes by heat Great Britain probably produces the most delicious grapes in the world. But even in the open air in the southern counties of England, if proper care is taken, very good fruit may be obtained; and although not so delicious for eating as hat produced by forcing, yet in all seasons a very eatable ruit may be obtained, and in warm dry seasons a very deicious one. But were the art of wine-making better understood in this country, vines thus grown might be used for this purpose. M'Culloch says:—'Chemical examination has proved that the young shoots, the tendrils, and the leaves of the vine, possess properties and contain substances exactly similar to the crude fruit. It was no unnatural conclusion that they might equally be used for he purposes of making wine. Experiments were accordingly instituted in France for this purpose, and they have been repeated here with success. From vine-leaves, water, nd sugar, wines have been thus produced in no respect differing from the produce of the immature fruit, and conequently resembling wines of foreign growth.' If the practice of making wine was generally followed, there are thousands and tens of thousands of square feet of walls and roofs in the cottages and houses in the southern proinces of England on which the vine might be successfully cultivated. The great drawback that has hitherto existed o the increased cultivation of the vine in the open air in his country has been ignorance of the proper mode of pruning it, and the allowing it to be overcropped. We extract from a work of Mr. Hoare, on the cultivation of he grape-vine on open walls, the following scale of the greatest quantity of grapes which any vine can perfectly mature in proportion to the circumference of its stem, measured just above the ground:—

Circumference.	lbs.	Circumference.	lbs.
3 inches	5	7 inches	45
3½ „	10	7½ „	50
4 „	15	8 „	55
4½ „	20	8½ „	60
5 „	25	9 „	65
5½ „	30	9½ „	70
6 „	35	10 „	75
6½ „	40		

The varieties of grapes recommended by Mr. Hoare for cultivation in the open air are the following:—1, Black Hamburg; 2, Black Prince; 3, Esperione; 4, Black Muscadine; 5, Miller's Burgundy; 6, Claret Grape; 7, Black Frontignac; 8, Grizzly Frontignac; 9, White Frontignac; 10, White Muscadine; 11, Malmsey Muscadine; 12, White Sweetwater; 13, Early Black July. These sorts embrace almost every variation in flavour, colour, and size of berry that can be perfectly ripened in the open air.

Of the grapes grown mostly in houses, the most esteemed of the round black grapes are—the Damascus, the Black Lisbon, the Muscat, or Purple Constantia, and the Black Morocco. Of the long black grapes, the Muscadel, the Burgundy, the Purple Hamburg, the Black Palestine, and the Black Raisin are the best. Of the round white grapes, the Amber Muscadine, the Malmsey Muscadine, the White Muscadine, the Pearl-drop, and the White Constantia are all good. Of long white grapes, the White Sokars, the White Muscat, and the Morillon, or genuine Tokay, are esteemed highly.

Some of the species of Vitis have been introduced into our shrubberies and gardens as ornamental climbers; and for this purpose the following are recommended, by Loudon, in the 'Arboretum Britannicum:'—

V. Labrusca, the Wild Vine, or Fox Grape, has heart-shaped leaves, rather 3-lobed, acutely toothed beneath; the peduncles tomentose and rather rusty. It is a native of America, and is cultivated there in vineyards, and is said to make a very pleasant wine. There are two varieties, one with white and the other with red berries. It grows to about the same height as the common vine. When cultivated the berries have a pleasant flavour, but are rough and acid when wild. The whole plant has a foxy smell; hence its name.

V. cordifolia, Heart-leaved Vine, or Chicken Grape, has heart-shaped leaves, acuminate, toothed in the mode of incisions, smooth on both surfaces; racemes loosely many-flowered; berries small, greenish, ripened late. A native of North America from Canada to Florida, on the borders of rivers and in woods, where it is called Winter-grape, from the late period at which it ripens its fruit.

V. riparia, River-side or Sweet-scented Vine, has heart-shaped leaves, shallowly 3-cleft, toothed in the mode of incisions and unequally; the footstalk and the margin of the nerves pubescent. This is also a native of North America, on the gravelly shores of islands and banks of rivers, and was found by Dr. Richardson at the south end of Lake Winipeg. It extends from Pennsylvania to the Carolinas. It is worthy of cultivation on account of its flowers, which have an exquisitely sweet smell resembling mignonette.

V. Caribæa, the Carib Vine, has heart-shaped acuminate leaves, toothed with acute and rather projecting teeth, rather glabrous above, tomentose beneath, peduncles tomentose; flowers small and white; berries small brownish-green, watery and acid, but eatable. It is a native of Jamaica. The fruit, according to Sloane, is about the size of currants, of a red colour, and agreeably acid, as well as astringent. They would probably make a good red wine. When it grows luxuriantly it is so full of juice that a piece of a shoot three feet long will give out a pint of clear tasteless water; and persons wandering in the woods have often recourse to it as a means of supplying drink. It is called in Jamaica Water-vine. Several other species of Vitis have been introduced at various times, especially of those from India, of which Wallich enumerates fifty, but none of them have presented any extraordinary recommendations.

[GRAPE-VINE; VINEYARD; RAISINS; WINE.]

(*Cyclopædia of Plants*; Bischoff, *Lehrbuch der Botanik*; Loudon, *Arb. et Frut. Brit.*; Burnett, *Outlines of Botany*; Hoare, *Practical Treatise on the Vine*; Meyen, *Geographie der Pflanzen*; Don, *Gardener's Dictionary*.)

VITO'RIA, a city which derives its chief interest for Englishmen from the victory gained by the Duke of Wellington, in its vicinity, over the French army. It is the capital of the province of Alava under the most recent constitutional division of Spain. It is 26 miles south-south-east from Bilbao, and 156 miles north-north-east from Madrid on the road from that capital to Bayonne. Vitoria is built on an eminence which overlooks an extensive plain to the north. The climate is agreeable in summer, but very cold in winter. The frosts and snow however are of brief continuance. With some exceptions the streets are regular, well built, and kept clean. The principal square has stone houses of considerable architectural pretensions, with piazzas under which are shops and storehouses. The town-hall forms the southern side of the square, and a market is held in the open space. Among the more remarkable buildings are—the Hall of the Biscayan Society; the Orphan Hospital; the General Hospital; one collegiate and four parochial churches; six chapels; three convents for monks, and two for nuns; a school of design; a library; and a museum containing a number of Roman antiquities. The manufactures of Vitoria are—leather; candles; chairs of reeds, which have a reputation throughout Spain; household furniture; copper vessels for culinary uses; pottery; table-linen, &c. Trade is carried on with Navarre, Old Castile (of which Vitoria is one of the principal depôts), and the ports of St. Sebastian and Bilbao, in bar and manufactured iron, chocolate, sweetmeats, wool, cloths, silks, shoes, and hats. The population in 1833 amounted to 12,000. The town is very old, and local tradition assigns its origin to the Romans. Sancho the Wise built a castle, and surrounded the town with walls, part of which are still standing. In 1431 John II. raised it to the rank of a city; and the title was confirmed in 1476 by Ferdinand the Catholic. The French occupied it from 1808 till they were driven out of it by the Duke of Wellington's army, on the 21st of June, 1813. (*Dictionnaire Géographique.*)

VITRE'. [ILLE ET VILAINE.]

VITRIFICATION. [GLASS.]

VITRIFIED FORTS is a name that has been given to certain remarkable stone enclosures existing in various parts of Scotland, which appear to have been subjected to the action of fire. Attention was first called to the subject by Mr. John Williams, a civil engineer of the last century, who had examined some of them while conducting certain mining operations in the Highlands under the orders of the Board of Annexed (or forfeited) Estates in 1773, and who, in 1777, published a disquisition about them under the title of 'An Account of some remarkable antient Ruins lately discovered in the Highlands and Northern Parts of Scotland; in a Series of Letters [13] to G. C. M. Esq.,' 8vo. Edinburgh. Williams gave these piles the name of vitrified forts, unhesitatingly assuming that they were artificial structures. In a letter to Lord Kames, prefixed to his pamphlet, and dated 10th March, 1777, he says, 'About a year ago, a copy of my paper concerning the vitrified forts was sent to London to be disposed of to the booksellers; but they looked upon it as a fiction.' Kames writes in answer, 'This discovery of yours will serve to detect an error that several ingenious naturalists have fallen into, of burning mountains formerly in Scotland—verified, say they, by the burnt remains still to be traced. I suspect that these remains are no other than the débris of the vitrified forts you mention.' Nevertheless this idea, that the so-called forts were of volcanic origin, was soon after started anew by Pennant, who had seen one of them, and was taken up by other speculators; in particular it was attempted to be established by the Honourable Daines Barrington in a paper read before the Antiquarian Society in 1781, and published in the sixth volume of the 'Archæologia' the following year. But this notion may be said to be now given up on all hands. The subject has also been discussed by Dr. James Anderson, in the fifth and sixth volumes of the 'Archæologia,' and in the tenth volume of his periodical publication called the 'Bee;' by Mr. Fraser Tytler (afterwards Lord Woodhouselee) in the second volume of the 'Transactions of the Royal Society of Scotland;' by various writers in Sir John Sinclair's 'Statistical Account of Scotland;' by Dr. John M'Culloch in the second volume of the 'Transactions of the Geological Society of London,' and in his 'Highlands and Western Isles of Scotland;' by Dr. Hibbert in various papers read before the Society of Scottish Antiquaries in 1831, and published in the fourth volume of their 'Transactions;' by Dr. Robert Jamieson of Edinburgh in the first volume of the 'Memoirs of the Wernerian Society;' by Sir George Mackenzie in the 'Edinburgh Encyclopædia;' and by the writer of a long article in the new edition of the 'Encyclopædia Britannica,' signed R. R. R.

The original description of the general nature of the vitrified forts given by Williams has not been corrected or contradicted in any material point by subsequent observers. And his views were supported at the time, on chemical and other considerations, by Dr. Black, and also by James Watt, who (apparently before the subject had attracted the attention of Williams) had personally and carefully examined the same fort (that on the hill of Craig Phaidrick, or Craig Patrick, near Inverness) which Pennant had hastily inspected. A description of this fort by Watt and a letter from Black are subjoined to Williams's account.

Every vitrified fort Williams had seen was situated on the top of a small hill, overlooking and commanding a surrounding valley or plain, always having at the summit a level area of greater or less extent, and for the most part inaccessible or very steep, at least on one side. Indeed he asserts that the hills are always difficult of access, except in one place, which has everywhere been strengthened by additional works, of which he gives a description. What is called the fort consists of a wall enclosing the level summit, generally, in part at least, rectilineal and rectangular, but sometimes having one or more of the sides curved to suit the shape of the area. Exterior to this is sometimes a second circumvallation, which in some instances approaches within a few yards of the first, in others is removed from it to a considerable distance; but this outer enclosure is merely constructed of loose blocks of stone; it is the inner wall only which is entirely or partially vitrified. Williams's account is that the materials have been 'run and compacted together by the force of fire; and that so effectually that most of the stones have been melted down; and any part of the stones not quite run to glass has been entirely enveloped by the vitrified matter; and in some places the vitrification has been so complete, that the ruins appear now like vast masses of fragments of coarse glass or slags.' Generally however it would appear that the vitrification is not so complete as the description would seem to imply, though it may be sufficiently applicable to the more perfect specimens: in many cases the fire has only given the wall a coating of glass; in some, only one side of the wall is vitrified. The walls appear to be, in almost all the forts that have been examined, partially thrown down; in some, 'the vitrified ruins,' Williams states, 'are nearly all grown over with heath and grass, and often appear at first sight like the ruins of some earth or sod buildings:' from the instances in which the structure seems to be most entire, it may be conjectured that its original height was commonly about twelve feet.

About fifty of these vitrified forts in all have been found, dispersed over the shires of Inverness (in which they are most numerous), Ross, Cromarty, Banff, Moray, Argyle, Aberdeen, Perth, Forfar, Kincardine, and Bute. Two or three have also been discovered in the southern counties of Wigton, Kirkcudbright, and Berwick. The most celebrated are that on the hill of Knockfarril or Knockfarril na Phian, that is, the Place of Fingal at Knockfarril, on the south side of the valley of Strathpeffer, two miles to the west of Dingwall in Ross-shire; that, already mentioned, on the hill of Craig Phaidrick, two miles west of Inverness; that on the hill of Noth, in Aberdeenshire; that on Dun MacSniochain, in Argyleshire; that on the hill of Dunadeer, in Aberdeenshire; that near Creich, in Sutherland; that near the church of Anwoth in Kirkcudbright; that on the hill of Dunskeig, at the entrance of Loch Tarbert, in Argyleshire; that on the castle hill of Finhaven, four miles to the east of the town of Forfar; that on the hill of Laws, near the village of Drumsturdymuir, a few miles to the north-east of Dundee; that at the entrance of the bay of Carradale, in Cantyre; that in the parish of Kingarth, in the Isle of Bute; that (very slightly vitrified) on Barryhill, in the parish of Meigle, Perthshire; those on Castle Finlay and Dunevan, in Nairnshire; that called Tordun Castle, about three miles from Fort Augustus; that on the west side of Gleneves, in Lochaber, about three miles south from Fort William.

Setting aside the theory of the volcanic or otherwise accidental origin of the vitrified forts, which appears to be untenable, seeing that they are manifestly artificial structures, we have still two suppositions between which to choose in accounting for the appearance they present. The vitrification may have been part of the process of their erection, and designed as a substitute for the ordinary cement; or it may have been the result of accident afterwards. The latter view was suggested by Lord Woodhouselee so early as 1783, and has since been supported by Dr. Hibbert and Sir George Mackenzie; the former, which was that taken by Williams and other early investigators, has been ably defended in recent times by the late Dr. John Macculloch. It is impossible for us here to enter at length into the considerations which have been advanced on both sides: they amount for the most part to very slight and unsatisfactory probabilities. Dr. Hibbert's notion is that the inclosures were intended for the protection of beacon fires; and he has endeavoured to show that the elevations on which they are erected are so chosen as that one of these signals could always be seen from another. Dr. Macculloch, on the other hand, maintains that this is not he fact. Besides, he observes that the extent of most of he enclosures is far beyond what could have been required or any beacon fire: the area of that at Amwoth, for intance, is not less than 2700 square yards. How also, it is asked, should it have happened, as is generally the case, hat the walls should be vitrified on both surfaces, the exerior as well as the interior, if the effect was produced nerely by the flame of a beacon lighted up within the inlosure? That they were intended for defensive military posts, Dr. Macculloch further contends, is manifest from he whole character of the works—both the vitrified walls nd the surrounding defences, all of which, he says, 'vary n form and size according to the ground they stand on, nd are so contrived, just as a military work would be in he hands of a modern engineer, that they may command ll the points of access, and prevent the enemy from dvancing anywhere under cover.' Lord Woodhouselee, dmitting them to have been really forts, or posts of deence, contends that the vitrification is most likely to have een occasioned by the application of fire to effect their lestruction. But perhaps the most decisive fact, if it may be relied upon, which has been advanced in the course of he controversy, is that stated by Macculloch, namely, hat the material of which the mysterious walls are built has evidently been selected with a view to its capability of being vitrified. He particularly mentions that, both at Dun MacSniochain and at Dunadeer, 'the forts are not rected out of the materials nearest at hand, which are inusible, but [out of materials] collected with considerable abour from a distance.' The materials that have been ommonly used are granite or moorstone, limestone, sandtone, and what is called pudding-stone, all of which have he quality of being more or less easily fusible by fire.

VITREOUS HUMOUR. [Eye.]

VITRI'NA, Draparnaud's name for a genus of Helicidæ (vol. xii., p. 107).

Generic Character.—Animal elongated, cylindrical, having the turbinated part small, a fleshy collar surrounding the neck, and furnished in front with a sort of appendage, which extends upon it in the form of a cuirass, and certain other linguiform retractile appendages, capable of covering nearly the whole shell. Tentacles four, cylindrical and retractile; the two upper ones ocellated at their summit. The foot separated from the body by a small furrow. Orifice of the pulmonary cavity on the right upon the collar, at the origin of the cuirass. Organs of generation united, and presenting their orifice near the right tentacle: sometimes a mucous pore at the posterior part.

Shell very small, spiral, delicate, transparent, and fragile, increasing rapidly in a horizontal direction; spire short, the last whorl very large; aperture vast, with a solid spiral columella, losing itself almost always in the last whorl. (Rang.)

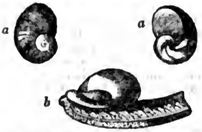
The species of this very delicate somewhat flattened genus have no umbilicus, and the lip of the large aperture is not reflected. The body of the animal is generally too large to enter the shell entirely, and the mantle has a double border, or, as M. de Férussac terms it, *une cuirasse et un collier*. The upper border, which is divided into many lobes, can extend itself far beyond the shell, and fold itself back upon it, so as to rub and polish it.

Geographical Distribution and Habits.—The genus is found both in Europe and warmer climates. The European species inhabit moist places, and are very small: those which occur in warmer countries are larger. Both are generally to be found on plants, under dead leaves, and in the hollows of rocks.

M. de Férussac has divided the genus into the genera *Helicolimax* and *Helicarion.* The last-named subgenus consists of exotic species, which seemed to him to approximate more nearly to *Parmacella*. [Limax, vol. xiii., p. 487.]

The number of species recorded by M. Deshayes in his Tables is five recent: no fossil species is mentioned. Neither he nor M. Rang consider the distinctions relied upon by De Férussac sufficient to warrant the adoption of these genera. The author last named, who divided *Limax* into two genera merely on account of the existence or absence of a mucous pore at the posterior extremity, applied the same test to the *Vitrinæ*. *Helixarion*, or *Helicarion*, consists of the species having a terminal mucous pore; *Helicolimax*, of those which have it not. Now the internal organization, observes M. Deshayes, of those *Limaces* which are without a mucous pore and those which have it is the same; and, according to the principles of zoologists and of M. de Férussac himself, genera ought to represent important modifications in the internal structure. These genera do not fulfil those necessary conditions, and therefore must be considered as artificial genera which ought not to be introduced into the system. MM. Quoy and Gaimard have thrown some additional light on the genus *Vitrina*, and have recorded some species whose shell resembles that of *Helix*, and which can entirely enter into it.

Helicolimax pellucida. Shell magnified. Animal nat. size.



a, Shell of Helicarion Cuvieri; b, Helicarion Freycinetti.

Seven species are noticed in the last edition of Lamarck, three of which are European, one from Teneriffe, one from Port Western (New Holland), and two from the island Celebes.

VITRINGA, CAMPE'GIUS, an eminent Dutch theologian, was born on the 16th of May, 1659, at Leeuwarden, in Friesland. He studied at Franecker and Leyden, and, after having obtained in the latter place the degree of doctor of divinity at the unusually early age of twenty, he was appointed, in 1681, professor of Oriental literature at Franecker. Two years later he obtained the chair of theology, and in 1693 that of sacred history also. In 1698 he was invited to a professorship in the university of Utrecht, with the high salary of 2000 thalers, but he modestly declined the offer, in consequence of which his salary was raised at Franecker to the same amount, and he remained in that place until his death, on the 21st of March, 1722. He left two sons, Campegius and Horatius, the former of whom likewise acquired some reputation as a theological writer, though he was much inferior to his father. Horatius died in 1696, at the age of eighteen.

Campegius Vitringa was one of the greatest divines of his time, and in learning he was not inferior to any. His works, nearly all of which are in Latin, are still valued very highly by theologians, but more especially his commentaries on portions of the Scriptures, among which that on Isaiah is one of the best that was ever written. The following works still deserve the attention of theological students:—1, Commentarius in Jesaiam,' 2 vols. fol.; 2, 'Anacrisis Apocalypseos Johannis Apostoli,' 1719, 4to.; 3, 'Commentarius in Zachariam Prophetam;' 4, 'Typus Theologiae Practicae,' 1 vol. 8vo.; 5, 'Observationes Sacrae,' 1711, 4to.; 6, 'Doctrina Religionis Christianae per Aphorismos descripta;' 7, 'Verklaring over de Evangelische Parabolen;' and 8, 'Aenleiding tot het rechte Verstand van den Tempel Ezechielis.'

(Vriemot, *Series Professorum Franequeranorum*; Niceron, *Mémoires des Hommes Illustres*, vols. xxx. and xxxv.)

VITRIOL, BLUE. [Copper.]

VITRIOL, GREEN. [Iron.]

VITRIOL, OIL OF. [Sulphur.]

VITRIOL, WHITE. [Zinc.]

VITRU'VIUS PO'LLIO, MARCUS, a Roman architect, well known for his work on architecture, 'De Architecturâ,' in ten books. The history of Vitruvius is known only by what he casually says of himself in his treatise. He is noticed only by two antient writers: by Pliny, who enumerates him among the writers from whose works he compiled; and by Frontinus, in his treatise on aqueducts, 'De Aquaeductibus,' who mentions him as the inventor of the Quinarian measure. Neither the time nor place of his birth is known, but he is generally supposed to have been born at Formiæ (Mola di Gaëta) in Campania, from several inscriptions relating to the Vitruvia family which have been found there. As he dedicated his work to the emperor Augustus when he was already old, and as it was written before the theatres of Marcellus and Balbus were built, which was in the year 13 B.C. (for when Vitruvius wrote, the theatre of Pompey was the only stone theatre in Rome), it follows that he must have been born about 80 B.C., or a little earlier. From what he says in the prefaces to his third and sixth books, it would seem that he was not very successful in his profession; he executed only one public work that is mentioned, a basilica at Fanum. He was however, at the time that he wrote, one of the superintendants of the engines of war, the others being Marcus Aurelius, P. Numisius, and Cn. Cornelius: a place which he had obtained through the recommendation of the emperor's sister; and it was on account of this appointment, as he himself says, that he dedicated his work to the emperor. He states that he had received a good education, and was fond of literary and philosophic subjects; that riches were no object with him, and that he was possessed of very little; but that he hoped to acquire a reputation with posterity for the treatise he was then writing. He mentions in the preface to his seventh book the architectural writers to whom he was chiefly indebted for information, namely, Agatharchus, Democritus and Anaxagoras, Silenus, Theodorus, Ctesiphon and Metagenes, Phileos, Ictinus and Carpion, Theodorus Phoceus, Philo, Hermogenes, Argelius, and Satyrus and Phyteus. He mentions also many other writers who wrote upon subjects more or less bearing upon architecture.

Vitruvius treats of many things in his work besides architecture or building, strictly speaking. The first book is divided into seven chapters, as follows:—Chapter 1 treats of the science of architecture generally, and of the education of an architect; and he mentions in it the origin of Caryatides and the Persian order, in illustration that a certain knowledge of history is requisite for an architect. He recommends also to architects, to a certain degree as almost indispensable, the study of writing, drawing, geometry, arithmetic, the principles of natural and moral philosophy, law, physic, music, and astronomy: and he continues to show how far each may be applied: chapter 2, on what architecture depends, or the various qualities which regulate its principles, as disposition (διάθεσις), proportion or dimensions (ποσότης), and economy or arrangement according to the uses for which the building is required (οἰκονομία), &c.: chapter 3, of the different branches of architecture; of building, of dialling, and of mechanics: chapter 4, of the choice of situations for buildings, in which healthiness should be the chief consideration: chap. 5, of the foundations of walls and towers, and their security: chap. 6, of the situations of the buildings of the town within the walls, which should be so disposed as to be sheltered from the winds; and of the winds, which were eight principal among the Greeks, but there were many other names for the various winds coming from different directions, of which, together with the eight principal, Vitruvius has made a diagram or σχῆμα, naming altogether twenty-four: chap. 7, of the situations of public buildings, in which he states that the temples of Venus, Vulcan, Mars, and Ceres should be without the city.

Book II. In the introduction he relates an anecdote of Alexander and Dinocrates, and the proposition of Dinocrates to convert Mount Athos into a statue of Alexander, &c. Chap. 1 treats of the origin of building, of the first appearance of fire, &c.: chap. 2, of the origin of all things according to the opinions of the philosophers: chap. 3, of bricks, of the earth of which they ought to be made, and of their dimensions: chap. 4, of sand: chap. 5, of lime: chap. 6, of Pozzolana: chap. 7, of stone-quarries: chap. 8, of the different kinds of walls, of the *reticulatum* and the *incertum*, and of the *isodomum*, the *pseudisodomum*, and the *emplectum*; also of cramping; brick walls are recommended in preference to stone; of the city of Halicarnassus and of the fountain of Salmacis, &c.: chap. 9, of timber: chap. 10, of the Apennines, and of the firs called *infernae* and *supernae*.

Book III. In the introduction he mentions a few successful and unsuccessful artists, and various causes of success. Chap. 1 treats of the design and symmetry of temples, of 'perfect numbers,' and of the names of temples as —*in antis*, *prostylos*, *peripteros*, *pseudodipteros*, *dipteros*, *hypaethros*: chap. 2, of the five species of temples—*pycnostylos*, *systylos*, *diastylos*, *araeostylos*, *eustylos*: chap. 3, of foundations, and of columns and their ornaments.

Book IV. Chap. 1, of the origin of the three kinds of columns, Doric, Ionic, and Corinthian; and of the origin of the Corinthian capital: chap. 2, of the ornaments of columns: chap. 3, of the Doric proportions: chap. 4, of the proportions of the cell and of the arrangement of the pronaos of a temple: chap. 5, of the aspects of temples: chap. 6, of the proportions of doors of temples: chap. 7, of Tuscan temples: chap. 8, of the altars of the gods.

Book V. Of Public Buildings. Chap. 1, of the forum and basilica: chap. 2, of the treasury, prison, and curia: chap. 3, of the theatre and its situation: chap. 4, of harmony, of the doctrine of Aristoxenus: chap. 5, of the brazen vases (ἠχεῖα) used in theatres for increasing the sound: chap. 6, of the shape of a theatre: chap. 7, of the portico and other parts of a theatre: chap. 8, of the three sorts of scenes, the tragic, the comic, and the satyric; and of the theatres of the Greeks: chap. 9, of the porticoes and passages behind the scenes; and of walks: chap. 10, of baths: chap. 11, of the palaestra: chap. 12, of harbours and other buildings in water.

Book VI. Of the arrangement and symmetry of private buildings. In the introduction he speaks of the advantages of learning, and relates an anecdote of Aristippus the philosopher. Chapter 1 treats of the situations of buildings, according to the nature and climate of different places: chap. 2, of their proportions, according to the nature of their sites: chap. 3, of courts (cavaedia), the Tuscan, the *Corinthian*, the *tetrastylon*, the displuviatum and the *testudinatum*: chap. 4, of courts (atria), wings or aisles (alae), the *tablinum* and the *peristylium*: chap. 5, of *triclinia*, *oeci*, *exedrae*, *pinacothecae*, and their dimensions: chap. 6, of the oeci (halls) of the Greeks (cyziceni): chap. 7, of the aspects of different kinds of buildings: chap. 8, of houses suited to persons of various ranks: chap. 9, of the proportions of country-houses: chap. 10, of the arrangement and parts of Grecian houses; of some Greek customs; of pictures called *Xenia*; of some discrepancies in Greek and Roman names of apartments, &c., and of the origin of the representation of Atlas with a globe upon his shoulders: chap. 11, of the strength of buildings.

Book VII. Of the finishing and decoration of Private Buildings. In the introduction, he speaks of books, libraries, and of book-making; of many writers on the arts and sciences, and also of some of the principal buildings of the Greeks, and their architects—as the temple of Diana at Ephesus, of Apollo at Miletus, of Ceres and Proserpine at Eleusis, of Jupiter Olympius at Athens, and of Honour and Virtue at Rome. Chap. 1 treats of pavements: chap. 2, of stucco: chap. 3, of stucco-work, and the method of preparing walls for painting or colouring in fresco, and of the excellence of Greek plaster: chap. 4, of stucco-work in damp places, and of pavements for triclinia: chap. 5, of the use of painting in buildings, and the different kinds of pictures proper for various apartments; of the inferiority of such decorations in the time of Vitruvius to those of the antient Greeks, and an anecdote of a certain painter of Alabanda: chap. 6, of the preparation of marble for plastering for painting: chap. 7, of natural colours such as are found in the earth: chap. 8, of vermilion and quicksilver, and of *anthrax*; and of the method of recovering gold from old gold embroidery: chap. 9, of the preparation of vermilion, and a test of its purity: chap. 10, of artificial colours and of black: chap. 11, of Alexandrian blue, and of burnt yellow: chap. 12, of white lead, of verdigris, and of red-lead: chap. 13, of purple: chap. 14, of factitious colours, purples, attic ochre, and indigo.

Book VIII. Of Water. In the introduction some antient opinions concerning water are noticed. Chap. 1 treats of the methods of finding water: chap. 2, of rain water, of climates, and of rivers: chap. 3, of the nature of various waters, of hot-springs, of mineral-waters, of poisonous and of acid waters, and of remarkable fountains, &c.: chap. 4, the same subject continued, the water of the Balearic Isles good for singing: chap. 5, of methods of judging of water: chap. 6, of levelling, and of the instruments used for that purpose, the dioptra, the level (libra aquaria), and the

horobates: chap. 7, of conducting water, which was done
three ways, in streams or channels, in leaden pipes,
ad in earthen tubes—Vitruvius recommends the last;
so of wells and of cisterns.

Book IX. On the principles of gnomonics and the rules
dialling. In the introduction he makes a few remarks
praise of the great services of many of the Greek philo-
phers. Chap. 1 treats of Plato's method of doubling
e area of a square: chap. 2, of Pythagoras's method of
nstructing a right-angled triangle: chap. 3, of Archi-
edes's method of detecting silver when mixed with gold,
so of discoveries of Archytas of Tarentum and of Eratos-
enes of Cyrene, &c.: chap. 4, of the universe and of
e planets: chap. 5, of the sun's course through the twelve
gns: chap. 6, of the northern constellations: chap. 7, of
e southern constellations; of the Chaldæans, and of
veral Greek astronomers: chap. 8, of the construction of
als by the Analemma: chap. 9, of various dials and their
ventors.

Book X. Of Machines. In the introduction Vitruvius
otices a salutary law of Ephesus, which kept architects
d others to their contracts, and regrets that no such law
as in force at Rome. Chap. 1 treats of machines and
gines generally, as scaling-machines, machines set in
otion by the wind, and draught machines; also of the
orn and other machines: chaps. 2, 3, 4, and 5, of ma-
ines of draught, of the wheel and axle, pulley, &c., and
lyspaston: chap. 6, of Ctesiphon's contrivance for remov-
g great weights, when he removed from the quarry the
afts of the columns for the temple of Diana at Ephesus:
ap. 7, of the discovery of the quarry whence stone was
ocured for the construction of the temple of Diana at
phesus: chap. 8, of the principles of mechanics:
aps. 9 and 10, of engines for raising water, of the
mpanum, and of water-mills: chap. 11, of the water-
rew: chap. 12, of the machine of Ctesibius for raising
ater to a considerable height: chap. 13, of the water-
gan, a very complex machine, which Vitruvius has done
s utmost, he says, to explain: chap. 14, of machines for
easuring the distance you travel by land or by water:
ap. 15, of catapultae and scorpions: chaps. 16, 17, and 18,
balistae and catapultae: chap. 19, of machines for attack,
the ram and the tower: chap. 20, of the tortoise for
ling ditches: chap. 21, of other tortoises: chap. 22, of
achines for defence.

There have been many editions of Vitruvius; the Editio
inceps was printed, without date or name of printer or
ace, about 1480, at Rome, by George Herolt, in folio,
der the superintendence of Sulpitius. It commences,
ithout a title, with 'Io. Sulpitius Lectori salutem. Cum
vinum opus Vitruvii,' &c. The small work of Frontinus,
Aqueducts, was printed with it. The next edition was
ablished at Florence, in 1496, with some other treatises,
so in folio; it is equally scarce with the Editio prin-
eps. There have been many others: at Venice, in 1497,
l.; and again, in folio, with wood-cuts, in 1511; the
iunta edition, in octavo, at Florence, in 1513, also with
ood-cuts; reprinted in 1522; again in 1523, without place
r date; at Strasburg, in quarto, in 1543; reprinted in 1550,
ith the notes of Philander, which were first published at
ome, in 1544, without the text; at Lyon, by Philander, in
552, in quarto, 'M. Vitruvii Pollionis de Architectura
ibri Decem ad Cæsarem Augustum, omnibus omnium
ditoribus longe emendatiores, collatis veteribus exem-
lis,' &c.; in 1567, in folio, at Venice, by Barbaro; at
yon, in quarto, in 1586; at Amsterdam, printed by
lzevir, in 1649, in folio, with additional notes and com-
entaries, and some other treatises, edited by John de
aet; at Naples, in 1758, in folio, with an Italian trans-
ation by the Marquis Galiani; at Berlin, in 2 vols. quarto,
1800, with a glossary in German, Italian, French, and
nglish; at Strasburg, in 1807, in 8vo; and in the same
ear, by Schneider, at Leipzig, in 3 vols. 8vo., which is the
est edition that has appeared, but it is without plates.

M. Quatremère de Quincy (*Biographie Universelle*)
tates that the first manuscript of Vitruvius was found in
he library of the Benedictine abbey of Monte Cassino,
ear Naples, and that the best is in the library of Franecker.
The translations of Vitruvius into various languages are
ikewise numerous: the following are into French; by Jan.
Martin, in 1547, folio, Paris; reprinted in 1572; by Jean
le Tournes, in 1618, quarto, Geneva; by Perrault, with
copper-plates, in 1673, folio, Paris; another edition, by the same translator, in 1684; by Le Bioul, in 1816, quarto, Brussels; into German, by Rivius, in 1548, folio, Nürnberg, reprinted in 1575 at Basle, and again at the same place in 1614; by Rode, in 1796, 2 vols. quarto, Leipzig; the first volume contains a Life of Vitruvius: into Italian, in 1521, by Benedict Jovius and Cæsar Cæsarianus, one of the architects of the cathedral of Milan, folio, Como; reprinted at Venice in 1524, but without the notes of Cæsarianus; and again, with a less copious index, in 1535. The first five books, by Caporali, in 1536, folio, Perugia; by Barbaro, in 1556, folio, Venice; and again, by Barbaro, in quarto, in 1567, reprinted in quarto in 1584, and in small folio in 1629 and in 1641; and by the Marchese Galiani, with the Latin text, in 1758; in folio, at Naples, and, without the Latin, in 1790; into Spanish, in 1602, by Urrea, folio, Alcala de Henarez; and at Madrid, in 1787, by Ortiz y Sanz, large folio, with plates: into English, by W. Newton, in 1771-91, with plates, folio, London; by W. Wilkins, R.A., in 1812, 'The Civil Architecture of Vitruvius,' in two parts, 4to., being a translation of the third, fourth, fifth, and sixth books only; but the text is not entire and the introductions are omitted; and in 1826, in royal 8vo., by Joseph Gwilt, London, to which is prefixed a list of the several editions and versions of Vitruvius, of which the one here given is an abstract. His work was translated into Flemish by Peter Koek.

VITRY-SUR-MARNE. [MARNE.]

VITTÆ, in Botany, a term most frequently applied to the receptacles of oil which are found in the fruits of Umbelliferous plants. The vittæ in the pericarps of these plants are found in two positions, either in the depressions between the ridges of the pericarp or in the seed itself. In the former case they are called *vittæ dorsales*, and in the latter *vittæ commissurales*. The vittæ have the same general characters as the receptacles of oils, resins, &c. in plants. Their sides are composed of condensed cellular tissue, and they always contain a volatile oil. All the volatile oils produced by the natural order Umbelliferæ, as those of anise, dill, fennel, carraway, &c., are obtained from the fruits of these plants, commonly called the seeds, and in which the oils have existed in the vittæ, and do not occur in any other part of the plant.

The term vittæ is also sometimes applied to the various stripes which are found upon leaves, and which either arise from irregular distribution or entire deficiency of colouring-matter in the tissues of the leaves of plants.

VITTEAUX. [CÔTE D'OR.]

VITTIE-VAYR, the Tamool name, sometimes written *Woetiwear*, of the highly fragrant roots of a grass which is found in many parts of India. These roots are sold in this country by perfumers, and employed in making brushes for velvet. They are much more extensively employed in India for making tattees, or the framework for doors and windows, which is thatched with this fragrant grass, and which, being kept constantly wet while the hot winds are blowing outside, allow the air to enter the house only after it has been cooled down by the evaporation of the water. This carries with it a portion of the fragrance for which the roots are so remarkable. A French author has made out of the plant which yields this root a new genus, which he calls Vetiveria, and the species V. odoratissima; but the plant is well known, and was first described by Retz, in 1785, under the name of Andropogon muricatum. It is sometimes formed with a few other species into the genus Anatherum. This is however now usually considered only a subdivision of Andropogon, many of which species are remarkable for the fragrance of their leaves, as Lemon-grass, Andropogon Schœnanthus, A. Calamus aromaticus, and others. Messrs. Vauquelin and Henry each analyzed these roots, though from their different names they supposed the plants must be distinct; but the analyses confirmed each other. A resin of a brownish-red colour, having the odour of myrrh, was obtained; colouring-matter soluble in water, a free organic acid, with salts of lime, magnesia, alumina, an oxide of iron, with starch and lignine. M. Cass obtained by distillation from these roots a volatile oil lighter than water, with some very fragrant distilled water. It is now used to a considerable extent by perfumers under a variety of names.

VIVARAIS, LE, or VIVAREZ, LE, a province of the government of Languedoc in France, bounded on the north by Le Forez, a subdivision of the government of Le Lyonais; on the east by the government of Dauphiné, from which it is separated by the Rhône; on the south by L'Uzégeois, or bishopric of Uzès; on the south-west by Les Cévennes; on the west by Le Gévaudan; and on the north-west by Le Velay—all four provinces of the government of Languedoc. Le Vivarais took its name from the city of Viviers: it was antiently included in the country of the Helvii, the Segalauni, and the Allobroges, all Celtic nations, and now forms the department of Ardèche [ARDECHE], of which Privas is the chief town. [PRIVAS.] Le Vivarais was divided into Le Haut Vivarais in the north, and Le Bas Vivarais in the south. The mountains of the north-west part are volcanic and rest on the high primitive table-land of central France. [VELAY, LE.] The table-land slopes rapidly to the south-east down into the valley of the Rhône, where the primitive rocks are covered by later formations. Red sandstone, probably corresponding to the old red sandstone of England, rests on the primitive rocks, and is in turn covered by the Jura limestone which occupies the valley of the Rhône. The volcanic rocks produced by the action of which Mont Mezene was the centre, extend nearly to the banks of the Rhône opposite Montelimart. [VELAY, LE.] Viviers is a small town, on the right or west bank of the Rhône. Its streets are narrow, dirty, and ill-built; and the cathedral has nothing remarkable except its elevated site. The bishop's house and the seminary for the priesthood are the principal buildings in the town. The population in 1831 was 1584 for the town, or 2536 for the whole commune. The townsmen manufacture thrown silk and woollen cloths, and trade in corn, wine, and silk. There are three yearly fairs. There is an observatory. The diocese of Viviers comprehends the department of Ardèche: the bishop is a suffragan of the archbishop of Avignon. (Scrope, *Memoir on the Geology of Central France.*)

VIVARES, FRANÇOIS, a celebrated engraver, born at Lodeve, near Montpellier, in 1712, and died in London in 1782. He was, it is said, originally a tailor, but he did not keep long to that occupation. He came early to England, and learned landscape-engraving here from J. B. Chatelain, but being possessed of great ability, he studied from nature direct, and formed a style of his own. His great excellence was in foliage, and he was one of the best engravers after Claude, 'and preserved,' says Strutt, 'as much of the picturesque beauties of that admirable painter as could be expressed by two colours only.' Strutt continues, 'He kept a print-shop in Newport Street, near Newport Market, for a considerable length of time, where he died some few years since. His widow still continues in the same shop (1786), and carries on the print-selling business.'

Vivares etched also with great freedom. His prints are not uncommon: Huber, in his 'Manuel des Amateurs,' &c., mentions fifty-seven, many of which are English landscapes. Strutt notices only four, all after Claude Lorraine. His works are unequal; some are hard, and are totally deficient in aërial perspective—a defect perhaps of the pictures engraved, for in his works after Claude, who was a great master in this respect, the aërial perspective is well expressed.

VIVARI'NI, the name of a celebrated family of painters in the fifteenth century, of the island of Murano at Venice.

The oldest of this family, the reputed Luigi Vivarini the Elder, lived about 1414, according to a picture in the church of Santi Giovanni e Paolo at Venice, inscribed with his name and this date; but as this is the only work attributed to him, Lanzi doubts whether there were two Luigis; and, as the inscription is not an autograph, he concludes that there is an error in the name or in the date, and that the picture may be the work of Luigi Vivarini called the Younger, who lived towards the close of the fifteenth century.

Ridolfi and Zanetti mention, after Luigi, a Giovanni and an Antonio Vivarini, or Da Murano; but Lanzi has shown that this Giovanni was a German, known as Joannes de Alemania, or Johann Alamanus. [VENETIAN SCHOOL.] There is mention of Antonio as late as 1451; he painted several works in company with Johan Alamanus and his own brother Bartolomeo Vivarini. Some of his pictures are still in a good state of preservation; they are richly coloured, and, for the period, well drawn: there is one of these works in the Venetian Academy, inscribed 'Joannes de Alemania et Antonius de Muriano pinxit.'

Bartolomeo was a more distinguished painter; he was the first Venetian who painted what is called in oil, his first picture in this manner is dated 1473: it is now in the church of Santi Giovanni e Paolo at Venice. He painted several pictures in oil and *a tempera*, in the Gothic style, and generally in various compartments, but in excellent taste for that style.

Luigi dei Vivarini the Younger was likewise a good painter for his period, 1490. His masterpiece is St. Jerome caressing a Lion, from which some monks are flying in fear, in the Scuola di San Girolamo at Venice. In the Sala delle Antiche Pitture, in the Venetian Academy, there are several pieces by Bartolomeo and Luigi Vivarini.

(Zanetti, *Della Pittura Veneziana*; Lanzi, *Storia Pittorica*, &c.)

VIVERRA. [VIVERRIDÆ.]

VIVE'RRIDÆ. Linnæus thus defines his genus *Viverra*:—

Dentes primores vi: intermediis brevioribus. *Molares* plus quam tres. *Lingua* retrorsum, sæpe aculeata. *Ungues* exserti.

The species comprised under this genus, in the twelfth edition of the *Systema Naturæ*, are *ichneumon*, *nasua*, *narica*, *putorius*, *zibetha*, and *genetta*.

Linnæus places the genus between *Felis* and *Mustela*.

The *Civettes* (*Viverra*) of Cuvier are amongst, in the last edition of the *Règne Animal*, between the Dogs (*Canis*) and the Hyænas, which are immediately followed by the Cats.

The Civets are subdivided into, 1, The Civets properly so called (*Viverra*, Cuv.); 2, The Genets (*Genetta*, Cuv.); 3, The Paradoxure (*Paradoxurus*, F. Cuv.); 4, The Mangoustes (*Herpestes*, Ill.); 5, The Suricates (*Ryzæna*, Ill.); and, 6, The *Mangues* (*Crossarchus*, F. Cuv.).

Cuvier says of this group that the genera composing it have three false molars above, and four below, the anterior of which sometimes fall out; two rather large tuberculous teeth above, a single one below, and two projecting tubercles on the inside of their lower carnivorous tooth anteriorly, the rest of that tooth being more or less tuberculous. Their tongue he describes as beset with sharp and rough papillæ; their claws are raised more or less in walking; and there is near their anus a more or less deep pouch, where particular glands secrete an unctuous and often odoriferous substance.

Mr. Swainson gives the family *Mustelidæ* a place between the *Felidæ* and the *Didelphidæ*.

At the head of the *Mustelidæ* he places the genera *Ryzæna*, Ill., and *Crossarchus*, Cuv., and then come the following subfamilies:—

Viverrinæ. *Mush-Weasels.*

Characters.—Three false grinders above, four below, the anterior lower ones not always permanent; two rather large tuberculous teeth above, one below; on the inner side of the lower carnivorous tooth are two projecting tubercles; tongue prickly; pouch beneath the tail.

Genera:—*Cynictis*, Ogilby; *Herpestes*, Ill.; *Viverra*, Linn.; *Genetta*, Desm.; *Cryptoprocta*, Bennett; *Paradoxurus*, F. Cuv.

Mustelinæ. *Martens*, &c.

Characters.—Cutting-teeth, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; grinders $\frac{4-4}{5-5}$ or $\frac{5-5}{5-5}$, one of which only is tuberculous; head small, oval; ears short, round; body long, slender; feet short.

Genera:—*Putorius*, Cuv.; *Martes*, Cuv.; *Mephitis*, Cuv.; *Mydaus*, F. Cuv.; *Lutra*, Ray, with the subgenus *Enhydra*, Flem.; *Gulo*, Storr; *Ratelus*, F. Cuv.

For the last subfamily, *Ursinæ*, see URSIDÆ.

The *Viverrina*, Mr. J. E. Gray's third family of *Felidæ*, is the first of his second subdivision of that family, viz. *Necrophaga*.

The *Viverrina* comprise the following

Genera:—*Viverra*; *Proteles*; *Prionodon*; *Genetta*; *Galidia*; *Galictis*; *Herpestes*; *Mungoz*; *Atilax*; *Ichneumia*; *Urva*; *Crossarchus*; *Ryzæna*; *Hemigale*; *Paradoxurus*; *Paguma*; *Arctictis*; *Cynogale*; *Cryptoprocta*; and *Bassaris*.

The *Viverrina* in Mr. Gray's arrangement stand between the *Hyænina* and the *Canina*.

Viverra (Cuv.).

Generic Character.—The deep pouch situated between the anus and the sexual organs, divided into two bags filled with an abundant concrete section of the consistence of *pomade* exhaling a strong musky odour, secreted by glands which surround the pouch. Pupil of the eye round during the day. Claws only half retractile.

Dental formula :—Incisors, $\frac{6-6}{6-6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{6-6}{4-4}=40$.

M. F. Cuvier remarks that this system of dentition, a cut of which will be found in the article ICHNEUMON, is common to the Civets, Mangousts, Genets, and Paradoxures, and that it is specially characterised by the number of tuberculous molars, viz. two in the upper jaw and a single one in the lower jaw. These animals therefore, he observes, would seem to take their station in the order of mammiferous *Carnivora* before the Dogs, which have two tuberculous molars in each jaw; but the Civets, having their canine teeth much less sharp and much more approximated to the form of the tuberculous teeth than the Dogs, are really less carnivorous than them, and consequently come nearer to the Raccoons and the Bears, by which M. F. Cuvier, in common with most zoologists, terminates the series of Carnivorous Mammals properly so called.

Mr. E. T. Bennett, in his *Tower Menagerie*, observes hat the group of animals comprised under the generic name of *Viverra* by Linnæus is, perhaps, the most puzzling, and certainly the least understood, amongst the true *Carnivora*, and hence there is no little difficulty in definng its limits and distinguishing the species which compose it. Under the genus Viverra, he remarks, Linnæus comprehended a series, or, to speak more properly, a congeries, of quadrupeds, differing from each other so remarkably in form, in structure, and in habits, as to render it absolutely impossible to find characters by which hey might be circumscribed and isolated from their fellows. Linné's definition of the genus, therefore, says Mr. Bennett in continuation, although purposely expressed n terms the most vague and indistinct, does not exclude uch animals as from their obvious affinities he could not efrain from referring to other groups, whilst it does not nclude one half of the species which he has arranged under it. The Ichneumon of the Nile, the Suricate of the Cape, the Coati of South America, the Stinking Weasels of he north, the Civet of Barbary, the Genet of the East, the Ratel of South Africa, and others equally distant in affinity, were swept into this common receptacle.

This arrangement, as Mr. Bennett states, brought together animals truly digitigrade, with retactile claws, ongues covered with sharp papillæ, canine teeth of great power and molars formed for tearing flesh, consequently n a high degree sanguinary and carnivorous in their habits, into close contact with others positively plantigrade, having exserted claws, smooth tongues, and teeth of little power for lacerating animal food—in short with animals more or less, in some instances entirely, vegetable eeders.

'The genus thus formed,' Mr. Bennett adds, 'presented o heterogeneous a combination, that the difficulty was ather where to stop in the dispersion of the dissimilar materials of which it was composed, than where to commence the necessary operation; and in consequence nearly a dozen genera, not hanging together in one coninued series, but scattered through various parts of the ystem, and most of them essentially distinct, have been he result of the dismemberment of this single group.

'The true Civets, to which the genus *Viverra* is now estricted, yield in the extent of their carnivorous propenities to the cats alone, whom they approach very closely n many points of their zoological character, as well as in heir predatory, sanguinary, and nocturnal habits. In addition to the six incisors and two canines which are ommon to the whole of the true *Carnivora*, they have on each side and in each jaw six molars, one of which is peculiarly adapted for lacerating flesh, while the rest are more or less of the ordinary form. Their tongues are furnished with the same elevated and pointed papillæ which give so remarkable an asperity to those of the cats, and their claws are half retractile. The toes are five in number on each of their feet, and their extremities alone are applied to the ground in walking; the animals are consequently completely digitigrade. But the most distinctive character of the group consists in an opening near the tail, leading into a double cavity of considerable size, furnished with glands and follicles for the secretion of the peculiar odoriferous substance so well known as the produce of the civet, and from which the animal derives its name.'

In the museum of the Royal College of Surgeons in London, No. 2514 of the *Physiological Series* exhibits the male organs of generation, with the perinæal integument, scent-glands, scrotum, rectum, and anus of the zibet (*Viverra Zibetha*, Linn.). The testes are concealed in the scrotum, from which the spermatic chords may be seen ascending to the sides of the bladder, where the vasa deferentia quit the chords to pass to the base of the small prostate: there are no vesiculæ seminales. The muscular part of the urethra is of great length: Cowper's glands are situated on each side of its termination: that on the left side is exposed immediately behind the left crus penis, which, in the preparation, has been detached from its bony connection. The penis is continued from the junction of the two crura forwards in front of the pubis to the small preputium, which is situated at the anterior part of the enlargement caused by the scent-glands: the glans penis, which has a pointed form, is bent downwards. The large orifices of the two lateral scent-glands are situated just within a longitudinal fissure bounded by two labia, which have been divaricated in the specimen, and a section has been removed from the right gland: the fissure is situated between the preputium and scrotum. No. 2515 is a preparation of the prostatic and muscular parts of the urethra, penis, scrotum, anus, and anal glands of a Viverrine quadruped. No. 2797 shows the female organs of a zibet. This preparation is suspended by the peritoneal capsules of the ovaria, which loosely surround those parts, but have been here reflected from them. The ovarian ligaments are seen passing upon the posterior parts of the cornua uteri; the fallopian tubes run in a tortuous direction along the anterior part of the ovarian capsules; they terminate, not at the apex, but by the side of the extremity of the uterine cornu, which forms a small cæcum. The broad peritoneal and the round fibrous ligaments are attached to the outer side of the cornua uteri. The body of the uterus as well as the cornua are preserved entire: the vagina is laid open, showing its longitudinally wrinkled inner surface and its inflected course. The urinary bladder and rectum, the vulva and anus, the large intervening peritoneal glandular pouch, and the anal glands, are also severally here shown. No. 2798 exhibits the female organs, with the large intestine and urinary bladder, of a civet. (*Viverra civetta*, Schreb.) The ovaria approach nearer to the globular form than usual. They are situated in shallow capsules, on one side of which the oviduct commences by a large elongated aperture. The cornua uteri are long, slender, compressed, straight canals. The corpus uteri is equally simple, but very short: the vagina is long. The urethro-sexual canal opens externally on a prominent vulva, above which there is a semilunar cutaneous depression, which receives the ducts of two large scent-glands: a section is removed from the right gland to show its follicular structure. A similar section has been removed from the anal gland, and bristles are inserted into the orifices of both these secreting organs. (*Cat.*)

Example, *Viverra civetta*.

Description.—Length of the elongated body from two to three feet; tail about half as long as the body. Height from ten inches to a foot. Hair of the body long, brownish-grey, with numerous interrupted transverse black bands or spots of the same colour. The hairs on the ridge or middle line of the back from between the shoulders are longer, and can be raised or depressed at the pleasure of the animal. Legs and most part of tail black; upper lip and sides of the neck almost white. Eyes surrounded each by a black patch. Two or three black bands pass from the base of the ears obliquely towards the shoulder and neck, which last has a broad black patch.

Locality.—North of Africa.

Habits, &c.—The civet approaches in its habits nearest to the foxes and smaller cats, preferring to make its predatory excursions against birds and smaller quadrupeds in the night, although, like these carnivora, it will occasionally attack its prey in the daytime.

In a state of captivity it becomes in a degree tame, but never familiar, and is dangerous to handle. The young are fed on farinaceous food, millet-pap for instance, with a little flesh or fish; and, when old, on raw flesh. Many of them are kept in North Africa to obtain the perfume which bears the name of the animal, and brings a high price. The civet is procured by scraping the inside of the pouch with an iron spatula at intervals about twice a week. If the animal is in good condition and a male, especially if he has been irritated, a dram or thereabouts is obtained each time. The quantity collected from the female does not equal that secreted by the male. Civet, like most other articles of this nature, is much adulterated, and it is rare to get it quite pure. The adulteration is effected with suet or oil to make it heavier.

Among the 'Portraits de Quelques Animaux, poissons, serpents, herbes et arbres, hommes et femmes d'Arabie, Egypte, et Asie, observez par P. Belon du Mans' (1557) is one of 'La Civette, qu'on nommoit anciennement Hyæna,' with the following quatrain:—

'Voyant cecy, tu voy de la Civette
Le vray portrait: qui rend abondamment
Par son conduit le Musc, pour excrement,
Odeur, que plus a sentir on souhaite.'

The civet in the Tower, from which Mr. Bennett took his description and figure, never produced any civet there, although it was a male, and, when Mr. Bennett wrote, had been a year in that menagerie.

The Civet.

Dr. Horsfield, in his *Zoological Researches*, figures and describes two Javanese *Viverræ*, viz. *Viverra Musanga*, var. *Javanica*, and *Viverra rasse*.

Of the first, the *Luwak* of the Javanese, *Musang-hulan* of the Malays, he says, that it so nearly resembles the *Viverra genetta* in size and colour that several authors have described it under that name. It also, he states, resembles the Genet in its manners and habits. 'If taken while young, it becomes patient and gentle during confinement, and receives readily animal and vegetable food. It requires little attention, and even contents itself with the scanty remains of the meals of the natives, with fish, eggs, rice, potatoes, &c., the structure of its teeth being particularly adapted to a vegetable diet. It prefers however delicate and pulpy fruits; but when pressed by hunger, also attacks fowls and birds. It is most abundant near the villages situated at the confines of large forests. It constructs a simple nest in the manner of squirrels, of dry leaves, grass, or small twigs, in the forks of large branches or in the hollows of trees. From these it sallies forth at night to visit the sheds and hen-roosts of the natives, in search of eggs, chickens, &c. Its rambles are also particularly directed to the gardens and plantations, where fruits of every description within its reach, and particularly pine-apples, suffer extremely from its depredations. The coffee-plantations in Java are greatly infested by the *Viverra Musanga*; in some parts of the island it has on this account obtained the name of the coffee-rat. It devours the berries in large quantities, and its visits are soon discovered by parcels of seeds which it discharges unchanged. It selects only the ripest and most perfect fruits, and the seeds are eagerly collected by the natives, as the coffee is thus obtained without the tedious process of removing its membranaceous arillus. The injurious effects occasioned by the ravages of the Luwak in the coffee-plantations are however fully counterbalanced by its propagating the plant in various parts of the forests, and particularly on the declivities of the fertile hills: these spontaneous groves of a valuable fruit in various parts of the western districts of Java afford to the natives no inconsiderable harvest, while the accidental discovery of them surprises and delights the traveller in the most sequestered parts of the island.' (*Zoological Researches in Java.*)

Viverra rasse, and *Viverra zibetha*.

Description of Viverra rasse.—Hair stiff, considerably long, with a downy appendage at the base. General colour tawny-grey, variegated with dark brown lines and spots. Eight dark lines extend longitudinally from the shoulders to the root of the tail. Intermediate lines continued and regular, exterior lines slightly interrupted and the brown of them varied with lighter shades of tawny. Sides marked with several interrupted lines which appear also on the shoulders and thighs. Head above and upper parts of the neck banded alternately with tawny and brown. A black spot on the anterior canthus of the eye and at the base of the ear; extremity of the auricle grey externally, its internal surface furnished with several small tufts of whitish hairs. Lips, cheeks, and under side of the neck lighter, greyish slightly diversified with tawny. A longitudinal line from the ears along the sides of the neck towards the shoulders. Several transverse bands on the anterior part of the neck: two of these mark the neck with a figure resembling the letter Y. Lower part of the extremities, breast, and inner side of the thighs saturated blackish brown with an obscure reddish lustre. Abdomen beneath blackish grey with a tawny hue. Tail with eight blackish rings, the intermediate rings grey, the colour becoming gradually more diluted and whitish towards the extremity. The tawny predominates generally over the grey in the young, in which the lines and bands are obscurely marked. Entire length from end of muzzle to root of tail one foot eleven inches: tail twelve inches.

This is the *Rasse* of the Javanese, who term the odoriferous secretion *dedes* or *jibet*.

Dr. Horsfield, from whose work we have drawn the description, says that a very perfect specimen of the *Viverra zibetha*, the *Tanggalung* of the Malays, forwarded from Sumatra by Sir Stamford Raffles, afforded the means of showing more distinctly the peculiarities of the *Rasse* by a careful comparison. The *Tanggalung* was two feet six inches long, and the tail eleven inches. The proportions of the parts of the body in the two animals were very different. *Viverra Zibetha* is comparatively stout, the neck short and thick, and the breast full and distended. The head is regularly attenuated and wedge-shaped in the *Rasse:* in the *Tanggalung* it is swelled, rounded, and bulging before the ears; then contracts very abruptly to a short muzzle. The ears are two lines distant in the *Rasse* and two inches in the *Zibetha*, which gives a very different physiognomy to the two animals. The tail is nearly cylindrical in the *Tanggalung*; in the *Rasse* it is regularly attenuated to a point. The fur of the two quadrupeds is very different: rigid, coarse, and rather scanty in the *Rasse*; close, soft, and with much down at the base in the *Tanggalung*, its thickness giving a peculiarity to the tail of the latter. *Viverra zibetha* has a single black line of considerable breadth in the highest part of the back, bounded on each side by a white line; external to this is an interrupted line of a dark colour, and the rest of the back and sides is covered with smaller spots so disposed as to give the appearance of transverse undulations to those parts. In the *Rasse* eight regular parallel lines are clearly marked. There is no difference between the two animals in the upper parts of the head and neck; but the marks on the lateral and anterior parts of the neck are very dark in the Zibet, while they are faint and indistinct in the Rasse, around whose tail the rings are strongly marked, whilst in the Zibet they are irregularly defined and scarcely perceptible on the under side.

Dr. Horsfield states that the name *Rasse*, like many other Javanese names, is derived from the Sanscrit; it is, as employed by the Javanese, a modification of *Rasa*, and is applied to the *Viverra* as producing an odoriferous substance. In the original, Dr. Horsfield observes, *Rasa* has various significations, of which flavour or taste appears to be the primary meaning; the others, he adds, relate chiefly to the senses, or to emotions arising from them: fluids or juices are comprised among its meanings, and many applications of the word *Rasa* and its compounds to odoriferous substances, perfumes, &c., might, he tells us, be adduced.

The specific names *Civetta* and *Zibetha* are derived from the Arabic.

'The *Viverra Rasse,*' says Dr. Horsfield in continu-ation, 'supplies in Java the place which the *Viverra civetta* holds in Africa, and the *Viverra zibetha* on the Asiatic continent from Arabia to Malabar, and in the arge islands of the Indian Archipelago. I have endea-voured to show that, by its form and marks, it is essentially distinct from the *Viverra zibetha;* and it differs as much n its natural disposition as in external characters. The *iverra zibetha* is an animal comparatively of a mild lisposition; it is often found among the Arabs and Malays which inhabit the maritime parts of Borneo, Macassar, and other islands, in a state of partial domesti-ation, and, by the account of the natives, becomes recon-iled to its confinement, and in habits and degree of ameness resembles the common domestic cat. The Rasse, on the contrary, preserves in confinement the atural ferocity of its disposition undiminished. As the erfume is greatly valued by the natives, it is frequently ept in cages; but, as far as I have observed, must always e obtained for this purpose from a wild state, never pro-pagating in a state of confinement.

'The *Rasse* is not unfrequently found in Java, in forests f a moderate elevation above the level of the ocean. Here it preys on small birds and animals of every descrip-ion. It possesses the sanguinary appetite of animals of his family in a high degree, and the structure of its teeth orresponds strictly with the habits and modes of life. In onfinement it will devour a mixed diet, and is fed on ggs, fish, flesh, and rice. Salt is reported by the natives o be a poison to it. The odoriferous substance is collected eriodically; the animal is placed in a narrow cage, in which the head and anterior extremities are confined; the posterior parts are then easily secured, while the civet is emoved by a simple spatula.'

The substance obtained from the *Rasse* agrees with the ivet afforded by the *Viverra civetta* and *zibetha* in olour, consistence, and odour. It is a very favourite per-ume among the Javanese, and applied both to their dresses, and, by means of various unguents and mixtures of lowers, to their persons. Even the apartments and the urniture of the natives of rank are generally scented with t to such a degree as to be offensive to Europeans; and t their feasts and public processions the air is widely illed with this odour.' (*Zoological Researches.*)

Viverra [illegible]

Genetta, Cuv.

Subgeneric Character.—Odoriferous pouches reduced to a slight depression formed by the projection of the glands, and without any perceptible excretion, although the odour is manifest. The pupil has a vertical slit, and the claws are entirely retractile, as in the Cats.

Example, *Genetta vulgaris,* the *Common Genet, Vi-verra genetta,* Linn.

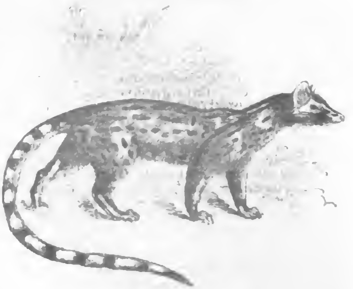
Description.—Grey, spotted with small black or brown patches, which are sometimes round and sometimes oblong; the tail, which is as long as the body, is ringed with black and white, the black rings being to the number of nine or eleven. There are white spots on the eyebrow, the cheek, and on each side of the end of the nose.

Geographical Distribution.—Cuvier states that this species is found from the south of France to the Cape of Good Hope, and says that it differs in the size and number of the patches, the bands along the shoulder and neck, the lines on the nape, &c.

Locality, Habits, &c.—The Genet loves lowlands, parti-cularly the banks of rivers and the neighbourhood of springs. In Constantinople it is domesticated, and kept in the houses, where it is said to catch mice as well as a cat.

Belon, in the work above cited, gives a very fair cut of it, with the following quatrain:—

> 'Bien que je sois assez sauvage beste,
> Ce nonobstant on scait m' apprivoiser,
> Et de mon corps, comme d un chat user,
> En me rendant domestique Genette.'



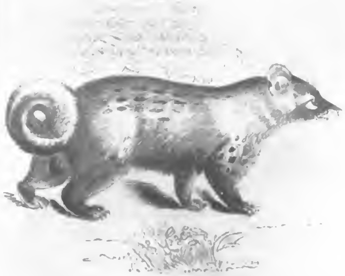
The Genet.

Paradoxurus. (F. Cuv.)

Generic Character, generally, that of the Civets and Genets. Tail capable of being rolled from above down-wards to its base, but not prehensile. Toes five, nearly palmated; sole of the foot tuberculous, applied throughout its surface to the ground; claws semi-retractile. Eyes with the pupil slit longitudinally. No pouch.

Dental formula:—Incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; molars $\frac{6-6}{6-6} = 40$.

Example, *Paradoxurus typus.*



Paradoxurus typus. (F. Cuv.)

The Paradoxure was confounded by Buffon with the Common Genet, a confusion which M. F. Cuvier dissi-pated: in form and habits, indeed, it does not differ much, and the toes and claws closely agree in number and re-tractility. The secretory pouch is absent. The tail is very peculiar: as long as the body, and depressed, not to say flattened, above and below; the extreme or more dis-tant half is, when extended, turned over, so that the lower side is uppermost, and the animal can roll it up spirally from above, downwards, and from the extremity to the base.

Description.—Greyish-black, tinged with yellow, the colour varying in different lights. One broad dorsal and two or three lateral narrower indistinct black lines. Lower jaw, legs, and tail, for the most part, black. Above and below each eye a whitish spot. Length, including the tail, upwards of three feet.

This is *La Marte des palmiers* of the French at Pondicherry.

Geographical Distribution and Habits.—The large islands of Asia. Its natural habits do not seem to be well known. Those that have been kept in captivity have manifested anything but a sociable disposition, receiving all attentions with peevish irritation or sullen insensibility.

Mangusta, Olivier.

(Ichneumon, Lacèp. Herpestes, Ill.)

Under the title ICHNEUMON a general sketch of the genus and a particular one of the Egyptian Ichneumon will be found. Dr. Horsfield has given a very interesting account of the

Mangusta Javanica.

Description.—Ear bearing considerable resemblance to that of man. Pouch very extensive. Hair long on the body and tail, but short on the head and extremities, rigid and glossy. Length, including the tail, about two feet and a half.

Dr. Horsfield states that the Javanese *Mangusta* is chiefly distinguished from the other Indian species, and particularly from the *Mangouste de Malacca* of M. F. Cuvier, by its darker colour. A ground of deep brown, passing with obscure undulations into black, is variegated with very numerous short longitudinal lines of a tawny colour. The upper parts of the back are more intensely coloured; the under parts scarcely perceptibly lighter.

Habits, &c.—Rumphius gives a curious account of this species, which is the *Garangan* of the natives, who greatly admire its agility. It attacks and kills serpents with the greatest boldness; and Rumphius speaks of its value in performing this service and its method of encountering those reptiles. The Javanese nobles, he says, pay a considerable price for it, that they may amuse themselves with the sport of these fights. When the two enemies are opposed to each other, the serpent endeavours to twine round the quadruped and kill it. The latter submits to this, but inflates itself to turgescence; and when the serpent enfolds it and advances its head to give the deadly bite, the *Mangouste* contracts his body, slips out of the folds, seizes the serpent by the neck and kills it. The mode of attack of the *Garangan* was stated to Dr. Horsfield by the natives precisely as it is related by Rumphius; but the doctor adds that the story regarding the antidote which is afforded by the *Ophioxylum serpentinum* to an animal which may have been wounded in the combat, was not reported to him; and he adds that it is one of those stories which, being founded on superficial observation, has too readily been credited and copied from one writer to another.

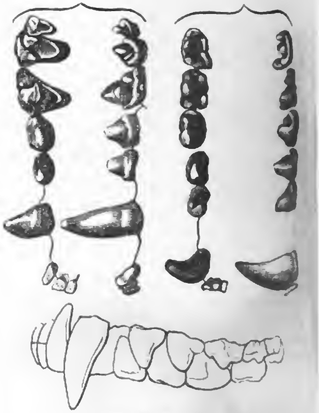
Mangusta Javanica. (Horsf.)

Dr. Horsfield states that the *Mangusta Javanica* is found most abundant in the large teak-forests, and that it is very expert in burrowing in the ground in pursuit of rats. 'It possesses,' says our author in continuation, 'great natural sagacity; and from the peculiarities of its character, it willingly seeks the protection of man. It is readily tamed, and in a domestic state it is docile and attached to its master, whom it follows like a dog; it is fond of caresses, and frequently places itself erect on its hind-legs, regarding everything that passes with great attention. It is of a very restless disposition, and always carries its food to the most retired place in which it is kept to consume it. It is very cleanly in its habits. It is exclusively carnivorous, and very destructive to poultry, employing great artifice in the surprising of chickens. For this reason it is rarely found in a domestic state among the natives, as one of their principal articles of food is the common fowl, and great quantities are reared in all the villages. The Javanese also, like the Mohammedans in general, have a great partiality for cats, and they are unwilling in most cases to be deprived of their society for the purpose of introducing the Garangan. It has also been observed that its sanguinary character shows itself occasionally in a manner that renders it dangerous in a family as a domestic animal, and it indulges at intervals in fits of excessive violence.'

Ryzæna, Ill.

Generic Character.—Feet rather long; toes four, armed with robust but not retractile claws proper for burrowing. Tongue furnished with horny papillæ. Ears small. Pouch leading into the anus. Tail long, slender, and pointed.

Dental formula:—incisors $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$, molars, $\frac{5-5}{5-5} = 36$.



Teeth of Ryzæna. (F. Cuv.)

This genus resembles the Ichneumons in the tinting and stripes of the coat; but the legs are longer and there are only four toes on each foot. The dentition too differs, for they are without the small molar immediately behind the canine.

Example, *Ryzæna capensis.*

Description.—Length about four feet, including the tail. Fur a mixture of brown, white, yellowish, [illegible] The colour of the hairs is brown at the bottom, black [illegible] the tips, and hoary at the points: those on the [illegible] dulated: inside of the legs yellowish-brown: tail [illegible] with black.

This is *The Suricate, Viverra tetradactyla,* Gm.

Geographical Distribution.—Africa, Cape of Good Hope. Cuvier remarks that the *Zenik* of Sonnerat's second voyage does not appear to differ from the Suricate, except that it is coarsely designed. Pennant says that it is also found in Java, where the Javanese style it *Jupe*, and the Dutch *Suracatje.*

Habits, &c.—At the Cape, Pennant states that this species is called *Meer-rat.* In habits and manner it is said to resemble the *Mangoustes*, and its urine is very fetid. It feeds on flesh, preys on mice, and is a great nemy to *Blattæ*. Pennant says that it makes a grunting oise, is much in motion, sits quite erect, dropping its fore egs on its breast, moving its head with great ease, as if n a pivot, and appearing as if it listened, or had just spied omething new. When pleased, he adds, it makes a attling noise with its tail, for which reason the Dutch t the Cape call it *Klapper-maus*. (Pallas, *Miscell. Zool.*)

The Suricate.

Crossarchus, F. Cuv.

Cuvier remarks that the *Mangues* (*Crossarchus*) have he muzzle, the teeth, the pouch, and the walk of the *Suricates*, but the toes and genitals of the *Mangoustes* or chneumons.

M. Lesson observes, that the animal which serves as he type of this genus ought to be placed between the *Mangoustes* and the *Suricates*, although its walk is plan-igrade, because it has the general physiognomy of both genera.

Generic Character.—Head more rounded than that of he Ichneumons, and the muzzle larger. The pupil round. The muzzle moveable. The ears small, round, and bilobate. The tongue smooth on its edges, but papillose and horny at the centre. The tail flattened. Five toes on ach foot. Pouch secreting an unctuous fetid matter.

Example, *Crossarchus obscurus*.

Description.—Length nearly two feet, including the ail, which is about eight inches. Fur consisting of two kinds of hair; the external rather harsh and of a uniform brown, a little brighter on the head, cheeks pale.

Locality.—Coast of Africa. Sierra Leone.

Habits, &c.—Resembling much those of the *Mangoustes*. It feeds on flesh, and is cleanly and well behaved in confinement.

Crossarchus obscurus.

Cryptoprocta, Bennett.

Mr. Bennett observes that this genus belongs to the *Viverridæ*, having the prickly tongue, the two tubercular molar teeth in the upper jaw, and the other characters by which the *Civets* are distinguished from the *Cats* on the one side, and from the *Dogs* on the other. It approaches, he remarks, more nearly than most of the other forms of this family to the *Felidæ*, having the claws on both feet truly retractile, and furnished with the retractile ligaments; those of the anterior limbs being also acute, both at their points and edges. In these respects, he allows that it agrees with *Paradoxurus*; as it does also in the nakedness of the soles of the feet, and in the union of the toes almost to their extremities by an interdigital membrane; but it differs from that genus by its short, smooth, and adpressed fur, by the uniformly haired coat of its slender cylindrical tail, the equal covering of which on all its surfaces appears to indicate that it is not capable of being curled in the manner so remarkable in the Paradoxure, and especially by the possession of a pouch.

Example, *Cryptoprocta ferox*.

Description.—Body slender, limbs robust and of moderate length; head narrow and slightly elongated; glandular muzzle small; nostrils with a deep lateral sinus; whiskers numerous and stiff, the longest exceeding the head in length; eyes rather small, placed above the angle of the mouth, the opening of which is not much prolonged backwards; ears unusually large, rounded, with a fold on the posterior margin and one or two sinuosities within, hairy both within and without, except in the auditory passage; neck slender; anterior limbs somewhat shorter than the posterior; tail (which appeared to be mutilated at the extremity) as long as the body, reaching, when retroverted, to between the ears, cylindrical, and uniformly hairy; soles of anterior feet naked to the whole extent of the *carpus*; of the posterior, nearly to the heel: claws retractile, five on each foot; on the anterior, sharp-pointed and edged, compressed, curved, short, and cat-like; on the posterior, rather larger, compressed, less curved, and obtuse. The toes united nearly to the tips; on the fore-feet the middle the longest; those on each side scarcely shorter and nearly equal to each other; innermost and outermost also nearly equal to each other, but still shorter than the adjoining ones: on the posterior feet, third and fourth toes nearly equal and rather longer than the second and fifth, thumb considerably shorter.

Colour of the whole upper and outer surfaces inclining to light brownish red, from a mixture of brown and straw-colour, in rings of greater or less extent on each hair; below and internally less deep, the individual hairs being more uniform in colour. Hairs short, smooth, soft to the touch, slightly crisped. Whiskers black at the base, somewhat lighter at the tips. Length from tip of nose to root of tail 13$\frac{4}{10}$ inches, of tail 11$\frac{4}{10}$ inches, but this organ was probably not entire. (Bennett.)

Mr. Bennett observes that this animal approaches the cats in its internal anatomy as well as its external characters.

The teeth were of the deciduous class only, and consequently, as Mr. Bennett remarks, could not furnish permanent characters. They consisted, in the upper jaw, of six closely-set incisors, of which the four intermediate were small, with their crowns a little flattened, and somewhat impressed transversely: the outer incisors were much larger than the intermediate, and had on their external surface somewhat the appearance of canines, and they had an internal process against which the crowns of the corresponding teeth closed. The canines were distant from the incisors, and projected from the jaw about twice the length of the outer incisors: they were curved backwards. Close to the canine on each side were two false molars; the first nearly cylindrical, with a slight process on the outer and posterior part of the crown; the second with a slender lengthened crown and two roots. A space, equal in length to the second molar, intervened between it and the third, which was large, and composed of three sharp longitudinally-disposed tubercles; the anterior having a small process behind; the second, twice the length of the preceding one, was simple, and directed somewhat backwards; the third formed a long transverse ridge: the middle tubercle was, at its base, somewhat lengthened inwards, but was without process or spur in that direction. The fourth molar adjoining the third was irregularly triangular; its outer and broadest portion was flat, the inner was much smaller, and was considerably lower in the crown than the outer. Behind this was a closed cavity in the jaw, containing the rudiment of a fifth, or second tubercular molar tooth. In the lower jaw the six incisors were nearly of equal size, the outer one on each side being acute at its top. The canine adjoined the external incisor, was more than twice its length, strong and broad at the base, narrower upwards, and curved somewhat backwards. Two false molars succeeded placed close to each other, similar to those of the upper jaw, and separated by a small interval from the canine anteriorly and the third molar posteriorly. The third molar had four acute tubercles succeeding each other longitudinally; the first was small and short, ranging scarcely higher than the second false molar; the second much stronger and twice the length of the first; the third corresponding nearly with the first and separated by a notch from the fourth, which was smaller and much lower. The fourth molar had also four sharp tubercles, of which the first two were strong and cutting, the second being the largest, and having behind it, and somewhat internally, the third, which was small and acute; the fourth resembled the fourth tubercle of the third molar. An enlargement of the bone behind this tooth showed that the pulp of a fifth molar was inclosed within the jaw.

Locality, Habits, &c.—Mr. Telfair, President of the Mauritius Natural History Society, who presented the animal to the Zoological Society of London, received it from the interior and southern part of Madagascar, and stated that it was the most savage creature of its size he ever met with: its motions and power and activity were those of a tiger, and it had the same appetite for blood and destruction of animal life. Its muscular force was very great, and the muscles of the limbs were remarkably full and thick. It lived with Mr. Telfair for some months.

Mr. Bennett, in conclusion, remarks that it is not impossible that this species may be identical with the animal described and figured by M. F. Cuvier in the 'Mémoires du Muséum d'Histoire Naturelle' (tom. ix., p. 46, tab. 4, fig. inf.), as a species of *Paradoxurus*, with the trivial name of *aureus:* the anal pouch which distinguishes it from *Paradoxurus* having, perhaps, Mr. Bennett observes, been overlooked by that distinguished zoologist. The colours, form, and proportions, he adds, appear to be the same. M. F. Cuvier's specimen was young, but not so young as that from which Mr. Bennett's description was taken: the country from which it was brought was not recorded. (*Zool. Trans.*)

Cryptoprocta ferox.

Here we shall notice the genus

Nasua, Storr.

Generic Character.—Feet pentadactyle, furnished with sharp claws. Tail long, pointed, not prehensile. Nose very much elongated, and very moveable. No anal follicles. Six ventral teats.

Dental Formula:—incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{6-6}{6-6} = 40$.

A cut of this dentition, stated by M. F. Cuvier to be common to the Raccoons and Coatis, will be found in the article URSIDÆ, vol. xxvi., p. 57.

Mr. Bennett observes that the Coatis are essentially distinguished from the Bears by the general form of the body, which in some measure approaches that of the Viverrine group; by their physiognomy, which is altogether peculiar; and by their elongated tail, which is nearly equal in length to their body. From the Raccoons they differ in their generally lengthened form, and especially in their produced and flexible snout. Their size nearly equals that of the common fox.

Geographical Distribution of the Genus and Habits.—South America, where they inhabit the woods, feeding principally on fruits, insects, and reptiles. They are easily tamed to a certain point, but do not become particularly attached.

No less than three species have been described. Two only however are generally admitted, and, even with regard to these, doubts exist whether they are more than varieties.

Description.—Male.—Length 3 feet 7 inches; tail [illegible] inches. Muzzle trumpet-shaped and slightly moveable in all directions; the nostrils placed at its extremity, their opening vertical; on their external sides a deep incision. A small whitish spot below the eye, another behind it, a third of the same colour originating at the back part of the eye, turns and descends from the upper part of the muzzle to its middle. The remaining part of the [illegible] half of the muzzle is black, and this colour appears in the white spot upon the inner angle of the eye. Lower jaw black, parts beneath the jaw white, which prevails on the upper lip at the corner of the mouth. The white continues from this corner to beneath the ear, passing to yellowish, and so it does beneath the throat. Hairs of the under part of the body dark at the tips and [illegible] orange on the remaining parts. Forehead yellowish white, like the rest of the hair of the body and sides, but dark at the tips. Tail ringed with dark and white. [illegible] black, as well as the ear, except its white edges [illegible] terior. Hairs of the tail longest and most erect. Individuals vary in colour, some having the hairs of the throat and of the upper parts white with black tips, the forehead and all the upper parts and sides whitish, also [illegible] with black; the feet very black, and also the hairs externally.

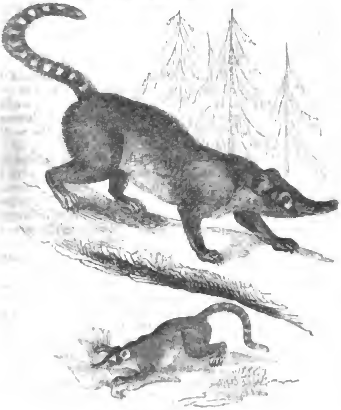
Female.—Of the same colour as the male, but [illegible] inches shorter; individuals varying in like manner.

According to D'Azara, *Cuati* or *Coatimondi* are the names given by the Guaranese to this animal.

Locality.—The same author states that the Coatis are only met with in the woods of Paraguay and as far as the river La Plata.

Habits.—D'Azara observes that the Coatimondi is solitary, or goes in pairs and small bands: that is, two or three females with their young are in the habit of congregating. He says that it climbs more expertly than a monkey without using its tail, and relates that it is said of these animals that a troop of them will drop to the ground from high trees when the latter are struck with a hatchet or stake. He adds that the habits of the fox are attributed to the Coati, but the elongated muzzle, in his opinion, renders it unfitted for preying upon animals generally; and he thinks that it can at the utmost only surprise birds on the nest, and devour their eggs and young.

To a domesticated one this observing Spanish zoologist brought mice, and it did not notice them; but he saw it catch some passing chickens and kill them, contenting itself however with only eating a small portion of the flesh near the collar-bone. No doubt remained on his mind that it feeds chiefly on fruits and insects, and only occasionally hunts birds. In continuation, he says that the Coatis are easily reared about houses, but are always secured, for they ramble about if suffered to be at large, upsetting and breaking whatever comes in their way. Untractable, it is not to be controlled even by blows. It will indeed amuse itself, and give signs of pleasure when scratched, but attachment, or even preference, he says, seems unknown to it. Its food in a state of domestication is bread, sugar-cane, flesh raw or cooked, fruits; in short it is omnivorous. In the act of feeding, it places its fore-paws upon the food, and holding it steady with its left paw, hollows or tears it out with its right: the fragments so procured it devours without conveying them to the mouth with its paws. On the approach of a man or a dog it snaps up the food and removes it as far as its chain will permit. It drinks often and laps more rapidly than a dog, turning the while its long muzzle upwards to avoid wetting it. The day is passed in paceing to and fro as far as its chain will allow, stopping in its walk only to eat or drink. When it turns it does not perform that evolution like a dog and most other animals, but raising its fore-paws turns upon its hind legs as upon a pivot. D'Azara had seen it playing with cats and young dogs, and sleeping in the embrace of one of the latter. The whole night was passed in repose, but it seldom slept during the day. It rubbed itself with the muzzle, scratched itself with the fore-paws and hind-feet; rested on its heels and uttered a shrill bird-like cry when pressed by hunger or annoyance. From dogs the Coati defends itself with its two-edged canines, sometimes inflicting mortal wounds. D'Azara saw a domesticated individual with a tumour on its abdomen, which did not appear to occasion inconvenience to the animal: when this tumour was ripe, the animal extracted the matter through a hole which it scratched. For six days the wound remained open without apparently affecting the animal, for it fed and moved about as if it had been in complete health; but on the seventh day, in the morning, the Coati began again to scratch till it broke open the abdomen. The animal continued to tear out its intestines as long as life remained.



The Brown Coati (Nasua narica)

Fossil Viverridæ.

Fossil forms belonging to this family have been found n the tertiary series, occurring in the bone caverns and one breccias, the gypsum of Montmartre, &c. From the atter locality comes *Viverra Parisiensis* (*Genetta*, Cuv.). Specimens have also been collected in Bengal and Ausralia.

VIVES, JOHN LOUIS, commonly called Ludovicus Vives, was born at Valencia in Spain, in March, 1492. He eceived his early education in his native country, and went to the University of Paris to study dialectic. He fterwards went to the University of Louvain, and there evoted himself to the study of the antient languages, nd ultimately became professor of humanity or the Latin anguage at Louvain. He had, at Paris, been a zealous isciple of the scholastic philosophy, but he had now beome disgusted with it, and, in 1519, he published a book gainst the schoolmen, entitled 'Liber in Pseudo-Dialecicos.' At Louvain Vives formed an intimate friendship with Erasmus and Budæus. He undertook to edit, for the eries of works of the Fathers set on foot by Erasmus, Augustin 'De Civitate Dei;' and this edition was published n 1522, and dedicated to Henry VIII., king of England. Henry very soon after invited Vives to England, and gave him the charge of the education of the princess Mary. For the benefit of his royal pupil Vives wrote two little essays on education, published under the title 'De Ratione Studii Puerilis Epistolæ Duæ.' Vives resided, while he was in England, principally at Oxford, was admitted in that university to the degree of doctor of laws, and read lectures on law and humanity. Henry VIII. went with his queen to Oxford, in order to be present at some of his lectures. Vives however soon lost the favour of the king by making open opposition to the divorce of Catherine of Aragon; he was put into prison by the king's order, and remained imprisoned for six months. When released, he left England, and went to visit his native country. He soon went from thence again into the Netherlands, and settled at Bruges, where he married, and devoted himself assiduously to study. The greatest number of his works were composed between his taking up his residence at Bruges and his death. He died on the 6th of May, 1540, at the age of 48.

Vives has a distinguished place among the philosophers who, towards the close of the sixteenth century, undermined the hitherto supreme influence of the schoolmen and gave an impulse to the study of classical literature He is spoken of as having been one of a triumvirate in the republic of letters, of which Erasmus and Budæus are the two other members, all three being equally distinguished for learning, while Erasmus had the pre-eminence in eloquence, Budæus in wit, and Vives in soundness of judgment. The works of Vives are very numerous, and comprehend a wide range of subjects, philology, mental and moral philosophy, and divinity. Those which are best known are—'De Causis Corruptarum Artium;' 'De Initiis Sectis et Laudibus Philosophorum;' 'De Veritate Fidei Christianæ;' and 'De Anima et Vita.' A complete edition of his works was published at Basle, in 2 vols. fol., in 1555, and another at Valencia, his birthplace, in 1782. A list of his works may be found in Niceron, 'Mémoires pour servir,' &c., tom. xxi., p. 172.

VIVIA'NI, VINCE'NTIO, a learned mathematician of Italy, who was born of a noble family at Florence, on the 5th of April, 1622: he received in that city a good general education, but having a decided inclination for mathematical researches, he applied himself diligently to the study of the antient geometry in the works of Euclid and Pappus, and he is said to have acquired a complete knowledge of the four first books of Euclid's 'Elements' without the assistance of a teacher.

In the seventeenth year of his age, Viviani became a pupil of Galilei, who was living in retirement at Arcetri, and who, though then blind and infirm, rendered him a proficient in the higher branches of mathematical science. After the death of that distinguished philosopher he continued during several years to prosecute his studies under the direction of Torricelli, who had previously been his fellow-pupil, and for whom, as well as for Galilei, he expressed to the end of his life the highest esteem and gratitude.

Before he was twenty-four years of age he formed the project of restoring the lost treatise of Aristæus entitled, in Latin, 'De Locis Solidis,' and he actually began the work: other occupations however prevented him for a long time from proceeding with it, and it was not completed till near the end of his life, though a first edition was published in 1673, at Florence. The treatise of the Greek geometer, who was nearly contemporary with Euclid, consisted of five books, and contained the demonstrations of certain properties of the conic sections; but nothing remains of it except the enunciations of the propositions, which have been preserved in the 'Mathematical Collections' of Pappus.

The work 'De Locis' being suspended, Viviani employed some of the leisure which his duties in the service of the grand-duke of Tuscany afforded, in the attempt to restore the fifth book of Apollonius of Perga on the conic sections, which, with the three remaining books of that writer, was then supposed to be lost. It was well known that the subject of that fifth book was the determination of the longest and shortest right lines in the conic sections; and Viviani had already made great progress in the work when, in 1656, Borelli discovered, among the MSS. in the Laurentian Library at Florence, a translation in Arabic of the conics of Apollonius, with a Latin inscription denoting that it contained the eight books of the treatise; the last book was however wanting. Having obtained permission, he carried the manuscript to Rome, and caused it to be translated into Latin by a learned Syrian named Abrahamus Ecchellensis: this translation was published in 1659, and Viviani, who had not then completed his work, apprehending that his labours might become fruitless, obtained a certificate to the effect that he had not been aware of the existence of the manuscript, and that he was unacquainted with the Arabic language. His 'Restoration' was published in the same year, under the title 'De Maximis et Minimis Geometrica Divinatio in quintum Conicorum Apollonii Pergæi adhuc desideratum,' fol., Florence; and when the work was compared with the translation, it was acknowledged that Vivani had pursued the subject beyond the point to which it had been carried by Apollonius himself.

From this circumstance Viviani immediately attracted the particular notice of his prince, and acquired a high reputation among the mathematicians of Europe. In 1672 the grand-duke Ferdinand gave him the title of chief engineer, and appointed him to proceed to the frontier of the Papal States for the purpose of consulting with Cassini, who was sent from Rome to meet him, concerning the navigation of the Chiana and the means of preventing the inundations of the Tiber. The measures proposed by the two mathematicians were not put in execution by the governments, but Viviani availed himself of the opportunity which his connection with Cassini afforded to join the latter in making astronomical observations, and even of carrying on some researches in natural history. In 1664, at the request of M. Chapelain, Colbert recommended Viviani to the king of France, Louis XIV., who assigned him a pension, and five years afterwards appointed him one of the foreign associates in the Académie Royale des Sciences. In 1666 he became a member of the Accadémia del' Cimento at Florence, and in 1696 he was elected a Fellow of the Royal Society of London.

About the year 1666 Viviani commenced a tract on the resistance of solid bodies against the strains to which they are subject, but his numerous occupations preventing him from immediately completing it, he was anticipated by Marchetti, who, in 1669, published a work on the same subject. As in this work the right of Galilei to the discovery of the law of the resistance was denied, Viviani took advantage of the delay to introduce into his tract a defence of his friend and preceptor; and in every respect his work appears to have been far superior to that of his opponent.

In 1674 he published a work entitled 'Quinto Libro degli Elementi d'Euclide, overro la Scienza Universale delle Proportioni spiegata colla Dottrina di Galilei,' to which he joined a tract designated 'Diporto Geometrico' (geometrical amusements), the latter consisting of the solutions, in the spirit of the antient geometry, of twelve problems which had been anonymously proposed: and some propositions of a like kind, which were proposed by Comiers having been sent to him, he published, in 1677, solutions of them in a work entitled 'Enodatio Problematum universis Propositorum à Claudio Comiers; præmissis tentamentis variis ad solutionem illustris veterum problematis de anguli trisectione.' This work is dedicated to the memory of his friend Chapelain; and in the preface he expresses a distaste for such challenges, observing that the problems are enigmas which are seldom proposed except by persons who have previously discovered their solutions; yet fifteen years afterwards he proposed as a challenge to the mathematicians of Europe a problem whose enunciation was fancifully stated in the following manner:—'Among the antient monuments of Greece there is a temple dedicated to geometry; its plan is circular, and it is covered by a hemispherical dome, in which are four equal apertures of such magnitude that the remainder of the superficies is accurately quadrable: it is required to determine the magnitude and the positions of the apertures.' The challenge appeared in the 'Acta Eruditorum,' under a designation which is an anagram of the words 'A postremo Galilei Discipulo,' a title of which Viviani appears to have been always proud. Solutions were almost immediately given, by the aid of the infinitesimal calculus, by Leibnitz and James Bernoulli in Germany, by the Marquis de l'Hôpital in France, and by Wallis and David Gregory in England: the solution given by Viviani himself is very simple, and it was published by him, but without a demonstration, in a small work entitled 'Formazione è Misura di tutti i Cieli, con la Struttura e Quadratura esatta d'un nuovo Cielo ammirabile,' [illegible] Firenze, 1692.

In 1701 he published, at Florence, a second and enlarged edition of his restitution of Aristæus, under the title 'De Locis Solidis Secunda Divinatio Geometrica in Quinque Libros amissos Aristæi Senioris, Opus Conicum, continens Elementa Tractatuum ejusdem Viviani, quibus tunc ipse multa in Mathesi Theoremata demonstrare cogitaverat.' The work is dedicated to Louis XIV., and the author avails himself of the occasion to express his gratitude to his preceptor Galilei. The subject is treated with great elegance and simplicity, and according to the methods of the antient geometers; it must be admitted however that the difficulty of the work would have been much diminished by the employment of the modern analysis.

Viviani was solicited by Casimir, king of Poland, to reside in that country; but from attachment to his native land, he declined the request, as he did the offer of Louis XIV. to make him his first astronomer. He built for himself, at Florence, a mansion, on the front of which he inscribed the words, *Ædes à Deo datæ:* and from respect to the memory of Galilei, he adorned the entrance with the bust of that philosopher. He died Sept. 22, 1703, in the 82nd year of his age, leaving behind him the character of having been a man of simple manners and a faithful friend.

(*Eloge de Viviani*, by Fontenelle, in the 'Histoire de l'Académie des Sciences,' for 1703.)

VIVIANITE. [IRON.]

VIVIERS. [VIVARAIS.]

VIZAGAPATAM. [CIRCARS, NORTHERN.]

VIZI'R, or VEZI'R, is the name of the ministers of the sultan of the Turkish empire, and is also given as a title of honour to several other high functionaries, civil as well as military. The word is of Arabic origin, and means literally 'the bearer of a burden,' as 'vezr' designates 'the action of bearing or carrying a burden.' Some write 'wazír' or 'vazír,' but this is not correct. From 'vizár,' a substantive which expresses the action of supporting a prince in the administration of his empire, is formed 'vizáret,' the dignity or function of a vizír, which we generally call 'vizirate.' There are two plurals of vizír, the Turkish plural 'vizírler,' which is the common, and the Arabic plural 'vuzerá,' which occurs in imperial decrees, as, for instance, in 'vuzerái 'izámi zeví-l-ihtirám,' 'the illustrious grand vizírs.' The post of a prime minister, who directs state affairs when the sovereign either will not or is prevented from doing it, is a very antient institution in the East; and the lieutenant of a king was called vizír by the Arabs and before this title was adopted by the Turks-Osmanlis. The first Turkish vizír was the celebrated 'Alá-ed-dín, the son of Osman, founder of the Turkish empire, who was appointed to the post of prime minister by his brother, Sultan Urkhan, in A.H. 726 (A.D. 1326). At first there was only one vizír. But Timur-Tash (Ironstone), a general of Murad I., having gained a great victory over the Turks-Seljuks of Caramania in A.H. 788 (A.D. 1386), his master gave him the title of vizír, and the then vizír, 'Ali Pasha, was created 'vizír 'azim,' that is, the great or illustrious vizír. From this time the number of vizírs was gradually augmented. Mohammed II. had seven; Mürad III., six; Mürad IV., nine; but from the time of Ahmed III. there were only seven vizírs who were real ministers. These vizírs are called vizírs of the cupola, and they form the divan of the grand vizír. The title of vizír is likewise given to the Beyler-Beys, or governors, of Rumelia, Anatolia, Damascus, and Cairo, to the four high judges, the grand equerry, the sirdar, or field-marshal, the chief master of the forests, and to several other high functionaries; and in former times it was given to the silihdar, or armbearer of the sultan, and to the agha of the janissaries, two dignities which are now abolished. Sometimes also this title is conferred upon governors of sanjaks, as was the case with the famous 'Ali Pasha of Janina, after his victories over the French in 1798. The insignia of a vizír are a splendid dress of velvet, embroidered with gold, pearls, and precious stones, a turban with an ornament of diamonds, and a standard, to the top of which are attached three horsetails, and which is carried before them by an officer: hence the title of pasha of three tails, which is identical with vizír. The dress of the grand vizír is still more magnificent than that of the common vizírs, from whom he is distinguished by several privileges: he receives the solemn visits of all the high functionaries, including the common vizírs; he commands he centre of the army in battle; and, except the sultan, he is the only person who is saluted with the 'alkish,' a kind of benediction pronounced by those who appear in he presence of the grand vizír. The words of the 'alkish' are 'Allah ömerler were efendümüze!' (God give a long life to our master!") The public functions of all the vizírs are described under TURKEY, pp. 393-4.

(Hammer, *Des Osmanischen Reiches Staatsverfassung*, &c.; *Geschichte des Osmanischen Reiches*; Thornton, *The Turkish Empire*; Kieffer et Bianchi, *Dictionnaire Turk-Français*, sub voc. 'Vizír' and 'Alkish.')

VLACQ, ADRIAN, a Dutch mathematician of the eventeenth century, who distinguished himself by his labours in the computation of logarithms. Being a bookeller or printer, he superintended the printing of the tables which he had composed, as well as of almost the first of hose which were computed by the mathematicians of this country.

Logarithms had then been recently invented, and while he employment of them was becoming general in Britain hrough the labours of Briggs, Gunter, and other indefatigable computers, Vlacq, in Holland, contributed greatly o extend their use and a knowledge of the principles of heir construction on the Continent. In 1628 he published at Gouda an edition of the 'Arithmetica Logarithmica' of Briggs, which contained the logarithms of numbers between 1 and 20,000, and also between 90,000 and 100,000, to fourteen places of decimals; but, having computed the logarithms of the 70,000 intermediate numbers, he published at the same place, in folio, a French translation of the above work, including in it the seventy chiliads, under the title of 'Arithmetique Logarithmétique:' all the ogarithms are given to ten places of decimals. It appears that part of the edition of the 'Arithmetica Logarithmica,' which had been published by Vlacq, was sold in England, contrary to the intention of the author; for Norwood, in his 'Trigonometria,' which was published in 1631, complains of such sale, and designates it an unfair practice.

Briggs having just before his death completed his great able of logarithmic sines and tangents, his friend Gellibrand wrote for it a preface and an account of the application of the logarithms to the purposes of plane and pherical trigonometry. This work, which was designated 'Trigonometrica Britannica,' was printed at Gouda by Vlacq in 1633. In the same year Vlacq printed a work, omposed by himself, which is entitled 'Trigonometria Artificialis, sive magnus canon Triangulorum Logarithmicus, ad dena scrupula secunda,' &c.: it contains the ogarithmic sines and tangents to ten places of figures, with differences, and to these is added Briggs's table of the first 20,000 logarithms with their applications, chiefly exracted from the 'Trigonometrica Britannica.'

In 1636 Vlacq published an abridgment of the 'Trigonometria Artificialis,' under the title of 'Tabulæ Sinuum, Tangentium, et Secantium, et Logarithmorum Sinuum, Tangentium, et Numerorum ab 1 ad 10,000,' in 8vo. These tables have passed through several editions in French and German; and, on the Continent, they continued long to be a manual for persons employed in making trigonometrical computations.

VLAARDINGEN is a market-town in the south part of the province of Holland, in the district of Rotterdam, on the river Maas. It is the rendezvous of the Dutch herring-fleet: the population is about 6500 inhabitants, who subsist by the fisheries.

VLADIMIR (formerly *Volodimir*) was part of the government of Moscow, till by an imperial ukase of 1st of September, 1778, it was formed into a separate government. It lies in the centre of European Russia, between 54° 58′ and 57° 11′ N. lat., and between 37° 42′ and 43° 20′ E. long. It is bounded on the north-west by Twer, on the north by Yaroslaw, on the north-east by Costroma, on the east by Nischnei-Novgorod, on the south by Riäsan, and on the west by Moscow. Its area is 17,500 square miles, divided into thirteen circles. The face of the country is an undulating plain, without mountains, diversified by low hills (none being 500 feet above the level of the sea), by the steep banks of the rivers, and extensive forests; there are also many heaths and morasses.

The principal river is the Oka, which however only raverses the government for a short distance on the south-west. It is joined by the Kliazma, which comes from the government of Moscow, crosses this province nearly in the middle, and joins the Oka in Nischnei-Novgorod. Its affluents are the Neil, Sudogda, Schitka, Kólokscha, Kamanka, Tesa, and some others. On the whole there are twenty-two large and small rivers, all of which have very pure water, and abound in fish. Among the numerous lakes, the two largest and most remarkable are the Peganowoe, in which floating islands are sometimes seen; and the Plestschejewo, which is about 5 miles long and 4½ broad, and is celebrated on account of the nautical exercises of Peter the Great.

The climate is as temperate as in Moscow: the rivers do not freeze till the middle of November, and they thaw in March. The winter however is very cold; the summer very hot; the spring and autumn variable, with an alternation of snow, rain, and fine weather: night-frosts do not cease till May, and return at the end of September. Intermitting fevers are endemic; otherwise the climate is healthy.

Agriculture is the chief occupation of the inhabitants; but though the soil is in some parts fertile when well manured, the heaths, marshes, sandy tracts, and forests cover so great an extent of surface, that the produce of the harvest is not sufficient on an average for the home consumption, and importation from the neighbouring governments is always necessary. Wheat, rye, barley, oats, millet, and peas are cultivated; but little flax and hemp, the soil in most parts not being suitable to them. The gardens produce all kinds of vegetables common in Russia, and most of them are full of apple and cherry trees; amongst the former is the beautiful transparent apple called Nakiwni. Here and there are some hop-gardens. The forests, formerly impenetrable, though still considerable, are greatly thinned and diminished: there are no oaks. Game, except hares and partridges, is rare; but bears, wolves, and lynxes are still met with. Wild berries of various kinds abound. The breed of horned cattle is merely sufficient for the wants of the province, and might be much improved and extended: the breed of horses however is excellent; there are two large studs belonging to the crown, and several belonging to private individuals. The peasants breed plenty of domestic poultry, but do not keep so many bees as in other parts. The fisheries in the lakes and rivers are of little importance; the principal fish are the sturgeon and shad: what is not consumed in the province is sent to Moscow. The minerals are iron, alabaster, good potters'-clay, and freestone.

The country-people, besides their agricultural occupations, spin thread and worsted, and manufacture coarse linen for their own use, for which they have good bleaching-grounds. The chief resource of this province is its manufactures, in which it is second only to that of Moscow. The principal manufactures are those of linen and cotton, leather, iron wares, glass, and crystal. The articles exported are the above-mentioned manufactures, paper, soap, and potashes; and of the natural productions, only fruit, timber, fire-wood, stone for building and millstones, and lime. All goes to Moscow by waggons or sledges: the Oka and the Kliazma, though both navigable, are not much used for the conveyance of goods. The towns of Pereslawl, Gorochavez, and Viäniki derive much profit from the transit and commission trade.

The inhabitants, amounting to 1,400,000, are all Russians of the Greek religion, with the exception of a few converted Mordwins and Tartars, and some Germans and Poles.

With respect to public education, this government is under the University of Moscow. The number of children attending the schools increases every year. In 1836 there was 1 pupil for every 234 inhabitants; at present the proportion of pupils is doubtless much greater.

VLADIMIR, the capital, is situated in the centre of the government, in 56° 17′ N. lat. and 40° 20′ E. long. It is built on a group of hills which rise in a fertile plain and decline towards the left bank of the Kliazma, which, making a bend, flows under the walls. It is one of the oldest cities in Russia, and from 1157 to 1328 was the residence of the grand-dukes and the capital of Great Russia. With the exception of its numerous churches and stone houses, Vladimir has few traces of its former greatness; there are no vestiges of the palace of the princes, and the Golden Gate has nothing magnificent except its name. The city is still large, but ill built, and has six gates, terminating the six principal streets. Of the 25 churches, the Cathedral of St. Mary, of which historians give pompous descriptions, to which its present appearance does not at all correspond, and the Cathedral of Demetrius, are remarkable in the history of Russia. There are two convents, an ecclesiastical seminary, and several crown buildings. It is the see of the bishop of Vladimir and Susdal, who has a palace, and the seat of the public authorities of the government. The inhabitants manufacture silk veils and handkerchiefs, and have some tanneries and soap manufactories; they derive their chief subsistence from the cultivation and sale of fruit, and of garden-vegetables. There are annual fairs, but otherwise little trade.

Pereslawl-Zaleskoe, is situated on the river Trubesch, where it empties itself into lake Plestschejews. It is an old town, and the houses are almost mean, but the 25 churches give it a striking appearance; there are also several convents which add to the effect. The population is 4000 inhabitants, who manufacture linen, silks, and woollen cloths. They have a profitable transit and commission trade, and have dealings with the Ukraine, Orenburg, and Siberia. The fairs are very well attended.

Murom, with 6500 inhabitants, an antient town, was once the capital of the Mordwins, and afterwards the residence of Russian princes; it has still 3 convents, 18 stone and 7 wooden churches, and several crown buildings. The inhabitants have some manufactures and considerable trade. The other towns, capitals of the circles, have nothing worthy of particular notice.

(Hassel, *Das Russische Reich in Europa;* Schnitzler, *La Russie, la Finlande, et la Pologne;* Krusenstern, *L'Instruction Publique en Russie;* Stein, *Lehrbuch*, by Hörschelmann.)

VLADIMIR (the First), grand-duke of Russia, surnamed the Great, was the son of Sviatoslav by a slave, or at least a woman of low condition.

His father, meditating the conquest of Bulgaria, divided, in 970, his empire between his two legitimate sons Yaropolk and Oleg. Vladimir was sent to Novgorod, as that unruly place, disdained by the legitimate princes, was considered a government only fit for an illegitimate son.

After Sviatoslav's death, 972, his sons remained at peace for five years, but in 977 Yaropolk, who ruled at Kiev, quarrelled with his younger brother Oleg, and, having slain him in battle, took his share of the paternal heritage. Vladimir, expecting an attack from his brother, fled beyond the sea to the Varingians, *i.e.* the Scandinavians, and Yaropolk occupied Novgorod by his officers.

Vladimir returned after two years from Scandinavia, with a formidable body of adventurers, and was joined by the inhabitants of Novgorod. He formally declared war against his brother, and demanded the hand of Rogneda, daughter of the Varingian Rogvold, prince of Polotsk. Rogneda, who was betrothed to his brother, rejected Vladimer's suit, saying, that she would not marry the son of a slave. Vladimir attacked Polotsk; Rogvold was killed with his two sons, and Rogneda was compelled to marry Vladimir.

Vladimir marched on Kiev, and Yaropolk, perceiving that he was betrayed by his own people, fled from his capital, but being soon afterwards induced to surrender, he was treacherously murdered by his brother's command. Vladimir now became monarch of the empire of his father, which extended from the vicinity of the Baltic to that of the Black Sea. It was however by no means a regularly constituted empire, like that of the Western monarchs of that time. The sovereignty of the grand-dukes of Russia, who had established their capital at Kiev, was limited to a tribute levied on the various Slavonian and Finnish populations spread over the immense tract of land which they considered as subject to their rule. This tribute was levied either by the sovereigns themselves, who travelled for that purpose about the country, or by their delegates: and their authority was respected only where they had a sufficient force to maintain it. Vladimir established a more regular and efficient system of government. He subjected all the populations which had recovered their independence during the preceding reign, and built many towns in order to maintain them in subjection. He also seems to have conceived the idea of cementing his vast and heterogeneous empire by the powerful bond of a religious centre, and he erected at Kiev the idol of Perun (thunder), the supreme divinity of the Slavonians, and those of the inferior deities, Khors, Dajbog, Stribog, Semargla, and Mokosh. The first three of these deities were Slavonian, and the last two Finnish, a circumstance which seems to imply the notion of uniting the religious worship of the two different races. To these deities were offered human sacrifices, chosen by lot, and the Chronicles relate that two Christian Varingians, father and son, fell victims to that bloody superstition.

Vladimir got rid of his Scandinavian allies by persuading them to pass into the service of the Greek emperor, and endeavoured to effect an amalgamation between the Varingians and Slavonians. He gave continual entertainments to his subjects, and the memory of the splendour of his court is still alive in the popular songs of Russia.

The Chronicles, which extol Vladimir's wisdom and valour, accuse him of great laxity of morals. Besides Rogneda, he had married the widow of his brother Yaropolk, a beautiful Greek nun, who was a captive of their father, and three other wives. He had a great number of concubines who lived in different places; as, for instance, at Vishgorod 300, at Belgorod the same number, at Berestov 200, and no woman in the country was secure from him. If such was really the case, the Chronicles have reason to say that he was fond of women, like Solomon.

Kiev had already for more than a century frequent intercourse with Constantinople, where Vladimir's grandmother Olga was baptized in 955. Her example, although it had not been followed by her son, found many imitators among his subjects, and the trade which was carried on between these two cities had undoubtedly attracted many Greeks to Kiev. It was also natural that missionaries of the Western church should be attracted by the renown of Vladimir from Poland and Germany. The Bulgarians, a Mohammedan nation, inhabiting the banks of the Volga, in the present government of Kazan, and celebrated for their commercial spirit, had, after a short war, concluded a solemn treaty of peace with Vladimir; and the powerful nation of the Khasars, which occupied the country between the Caspian and Black seas northwards to the Caucasus, and bordering on Vladimir's empire, contained many Jews; even the kings had for some time followed the Jewish religion, although at the time of Vladimir they were Christians. This will explain the circumstance that all these religious professions tried to convert Vladimir to their respective creeds. It is said that the polygamy permitted by the Koran and the sensual paradise promised to its disciples had greatly pleased him, but that he would not consent to give up wine. The religion of the Jews, who were exiles from their own country, could not produce a favourable impression upon a warlike prince. The Greek church, which already numbered many converts in Russia, had a great advantage over that of Rome, whose missionaries were strangers in that country, and Vladimir answered their exhortations by saying, 'Our ancestors have not known you.' When Vladimir consulted his nobles on the same subject, the answer which they gave him was, 'If the Greek religion was not good, thy grandmother Olga would not have adopted it.'

Besides this circumstance Vladimir had motives of ambition which prompted him to become a convert to the Eastern church. This was a matrimonial alliance with the Imperial house of Constantinople, which was then generally sought by the rulers of the barbarian nations bordering on the empire. In order to insure the success of his object, he began by an attack on the frontiers of the empire, and having besieged the important town of Cherson in the present Crimea, he demanded the hand of the princess Anna, daughter of the emperor Romanus the Second, and sister of the then reigning emperors Constantine and Basilius, and of Theophania, empress of Otho the Second of Germany. He promised, if his request was granted, to receive baptism with all his subjects, and to become an ally of the empire, which he threatened with war in case of a refusal. His demand was granted; he was baptized with his followers at Cherson, and married the Greek princess in A.D. 988. He immediately applied himself with great zeal to the establishment of Christianity in his dominions; all the idols were destroyed by his orders, and the inhabitants were baptized in crowds. He built churches, established schools, and his exertions were greatly facilitated by the circumstance that there was lready a Slavonian version of the Scriptures by Cyrillus nd Methodius [Slavonians], as well as liturgical works n the same language. An ordinance on the ecclesiastical ribunals, taken from the Greek Nomocanon, was published by Vladimir, and he became so strongly penetrated with he spirit of Christian meekness, that he would no longer punish with death even the greatest criminals, and was content to fine them. This ill-judged lenity produced great disorders, and the clergy themselves were obliged to emonstrate against it, and to induce Vladimir to restore public order by capital punishments. He is said to have entirely amended his former licentious manners, and his charity to the poor was unbounded. He divided the government of his empire among his eleven sons, whom he had by several wives, and his stepson Sviatopolk, with whom his murdered brother's widow was pregnant when he married her. After his conversion he had some wars with his neighbours, but they did not produce any consequences; and his reign was chiefly spent in promoting the civilization of his subjects, for which he received ample means from Constantinople, then the only seat of arts and iterature in Christian Europe.

The end of his life was disturbed by the growing spirit of liberty at Novgorod. The citizens of Novgorod refused to pay the annual tribute sent by that city to Kiev. His son Yaroslav, who was established by him at Novgorod, took the part of the inhabitants, at least he did it apparently, as some suppose. Vladimir assembled an army in order to coerce his refractory subjects, but he died on his march not far from Kiev, in 1014. His wife Anna died n 1011, as it seems without issue. The Russian church has placed him amongst her saints, and given him a rank equal to that of the apostles.

VLADIMIR MONO'MACHOS, grand-duke of Kiev, is one of the most remarkable persons of the middle ages, whose life and writings present an interesting picture of the social state of Russia during the eleventh and twelfth centuries. He is extolled by the Chronicles as a most virtuous prince, and considered by them almost a saint. He was undoubtedly a man of superior character and abilities, but by no means free from the faults of his barbarous age.

Vladimir was born in 1052. He was the son of Vsevolod, the grandson of Vladimir the Great. The division of the empire made by Vladimir's grandfather Yaroslav the Great, in 1054, produced incessant wars among his successors, who continued to subdivide their heritages among their children. By the same arrangement of Yaroslav, the sovereignty over all the other princes belonged to the grand-dukes of Kiev, who succeeded to that dignity, not according to the law of primogeniture, but according to that of seniority, or as being the oldest of all the princes of Russia. This arrangement, customary at that time with all the Slavonian nations, led unavoidably to quarrels among all those who either had any right to or possessed the means of claiming the throne of Kiev. This unfortunate state of Russia was rendered still worse by the appearance of the Polovtzee, or Comanes of the Byzantines, a nomadic nation, who arrived from the deserts of Central Asia and encamped in the country extending northward from the shores of the Black Sea and that of Azoff, about the middle of the eleventh century. These nomadic people made continual inroads into the territories of the Russian princes, but were also frequently employed by them as auxiliaries in their internal and foreign wars. Vladimir made his first campaign under his relative Boleslav the Second, or the Dauntless, king of Poland, whom he joined with an auxiliary force in a war against Bohemia in 1076. He afterwards took an active part in the domestic quarrels among the Russian princes, and received from his father, who became grand-duke of Kiev in 1078, the principality of Chernigoff, which was the lawful heritage of his cousin Oleg, having on a former occasion obtained, in an equally illegal manner, that of Smolensk, which was given him by the father of the same Oleg whom he now spoiled. This circumstance created a deadly hatred between the two cousins, established an hereditary feud between their descendants, and entailed for a long time great disasters on the country. Having taken during these wars the town of Minsk, he did not spare 'either man or beast;' and when his cousin Oleg was marching with the Polovtzee to recover his principality, Vladimir bribed those barbarians, who carried back the prince whom they came to assist as a captive, and murdered his brother. He also compelled the legitimate prince of Novgorod to cede it to his son, and to content himself with a small principality. This proves that he was no more scrupulous than his contemporaries in the means of attaining his objects.

Vsevolod died in 1093, but Vladimir, who was the real sovereign during the reign of his father, did not venture to break the law of seniority, and he called to the throne of Kiev his cousin Sviatopolk, prince of Turov, the eldest of the family. Sviatopolk confirmed the possessions usurped by Vladimir during his father's life; but both these princes being defeated by the Polovtzee, Oleg, who since his expulsion had lived in exile, chiefly in Greece, returned to the country, and compelled Vladimir to restore Chernigoff and Smolensk to him and his brother. The differences among the princes were settled by a congress held at Lubech and at Kiev, on which occasions Vladimir displayed, in the prosecution of his interests, great diplomatic talents. He also defeated, with the assistance of other princes, the terrible Polovtzee on several occasions, by which he secured for some time the country from their devastations, and justly acquired great popularity. In 1112 he became, on the death of Sviatopolk, grand-duke of Kiev, being already sixty years old. He reigned thirteen years till 1125, and he proved himself during this time a really great prince. Internal peace was maintained by his authority, and foreign enemies were repelled with uninterrupted success. New towns were built, old ones improved, and the country enjoyed general peace and prosperity.

His character, his views, and his principles are displayed by his testament, or his last instructions to his children, which also gives an insight into the manners, the state of civilization, and the prevailing opinions of that period.

After having expatiated on the glory of God, chiefly in words taken from the Psalmist, he says: 'O my children! love God! love also mankind! It is neither fast, nor seclusion, nor monastic life which may save you, but good works. Do not forget the poor; feed them and think that all goods belong to God, and are intrusted to you only for a time. Do not conceal treasures in the bowels of the earth, for this is contrary to the Christian religion. Be fathers to the orphans; judge yourselves the widows, and do not permit the stronger to oppress the weaker. Do not take the life either of the innocent or of the guilty: the life and the soul of a Christian are sacred.' He then recommends them to keep their oaths, to respect the clergy, to avoid pride and every kind of profligacy, and continues —'In your household look yourselves to everything, without relying on your stewards and servants, and the guests will not find fault either with your house or with your dinner. In time of war be active and be an example to your officers. It is not then the time to think of banquets and enjoyment. Repose after having established the nightly watch. Men may suddenly perish, therefore do not lay aside the armour where danger may happen, and mount your horses early. Above all, respect a stranger, be he a great or a common man, a merchant or an ambassador; and if you cannot give him presents, satisfy him with meat and drink, because strangers spread in foreign countries good and bad report of us. Salute every one whom you meet. Love your wives, but give them no power over yourselves. Remember every good thing which you have learnt, and learn what you do not know. My father, having never been abroad, spoke five languages, for which we are praised by foreigners.' This is certainly a curious fact, and which perhaps was not common at that time in western Europe. The languages alluded to were probably the Greek—as the higher clergy, who had the education of the princes, were generally of that nation—the Scandinavian, the Slavonian of Russia, and perhaps the Hungarian and that of the Polovtzee, with whom the Russians were in daily intercourse. It is also not unlikely that Latin, which was cultivated by the learned Greeks, was one of the languages alluded to. 'Avoid idleness, it is the mother of all vices. On a journey on horseback, when you have no occupation, instead of indulging in idle thoughts, repeat prayers, at least the shortest and the best of them— "Kyrie eleyson." Never go to sleep without an earthly prostration; and when you do not feel well, do it three times. Rise before the sun and go early to church. So have done my father and all the good men. After which they held a council with their officers, or judged the people, or went to hunt; and at midday they slept, because God has assigned the midday hour for repose, not only to man, but also to animals and birds.' It is remarkable that this habit is still prevalent among the common people in Russia. 'Your father lived also in that manner. I have done myself all that I could have ordered a servant to do: in hunting and in war, at day and at night, during the heat of summer and the cold of winter, I have not known any repose. I have never relied on magistrates and officers. I never allowed the poor and the widows to be oppressed by the strong. I superintended myself the church, the Divine service, the household, the stables, the hunt, the hawks, and the falcons.' Having enumerated his various feats of arms, he says, 'I have undertaken eighty-three expeditions, without mentioning many insignificant ones. I have concluded with the Polovtzee nineteen treaties. I took prisoners more than a hundred of their best chieftains, whom I released afterwards, and I punished and drowned in rivers more than 200 of them. Who travelled more rapidly than I did? On leaving Chernigoff in the morning, I arrived at Kiev, where my father was, before vespers (a distance of 100 English miles). Being fond of sports, we often hunted wild animals with your grandfather. Amidst thick forests I have bound with my own hands several wild horses at once. I was twice tossed on the horns of a buffalo; a deer struck me with his horns, and an elk trampled me under his feet; a wild boar tore the sword from my side; a bear bit through my saddle, and a wild animal attacked and overthrew the horse which I rode. How many times have I fallen from my horse! I twice broke my head, and many times injured my arms and legs, sparing not my life during my youth. But the Lord has watched over me. And you, my children, do not fear death, nor combat, nor wild animals; but act as men on every occasion which may come from God. When Providence has decreed a man's death, neither his father, nor his mother, nor his brethren may save him.' It is very probable that the observation of the rules of prudence and external piety laid down in these instructions greatly contributed to the establishment of his reputation.

Vladimir was surnamed Monomachos by his mother, a daughter of the emperor Constantine IX., Monomachos. His first wife was Gyda, daughter of Harold, the last Saxon king of England, who had found, after the death of her father, a refuge at the court of Swen the Second, king of Denmark. Marriages between the Russian princes and those of western Europe, particularly of Scandinavia, were very common during that period. Thus Vladimir's aunts were married to Henri I. of France, and to Harold Hardrade, king of Norway, who perished in 1066, at the battle of Stamford Bridge. The celebrated Danish king Waldemar the First was the son of one of his granddaughters, and probably received his Slavonian name in honour of his ancestor. After the death of Gyda he was twice married, but the Chronicles do not mention the names of his wives.

The crown used at the coronation of the monarchs of Russia is called the golden cap of Monomachos, and is supposed to have been presented to Vladimir, with the sceptre and some other regalia used on the same occasion, by the Greek emperor Alexius Comnenos, as having belonged to his grandfather Constantine Monomachos. These objects are undoubtedly of Byzantine workmanship, but the history of their origin is considered by many as a modern invention made during the fifteenth century, when Ivan the Third, of Moscow, having married the Greek princess Sophia Palaeologos, assumed the pretensions of a successor to the emperors of the East.

VLIESSINGEN. [FLUSHING.]

VOANDZEIA, a plant of the natural family of Leguminosæ, which has been so named from its Madagascar name, which is also written Voandzou. It has been formed into a distinct genus by Du Petit Thouars; though formerly called Glycine subterranea, it is more closely allied to Arachis hypogæa, or the Earth-Nut of the coast of Africa and of Asia. The genus is characterised by having the flowers polygamous. Calyx campanulate. Wings of the papilionaceous flowers horizontal. Stamens diadelphous. Legume subterraneous, roundish, fleshy, one-seeded. The only species of the genus is V. subterranea, which is so called in consequence of its peduncles bending down and sinking into the ground, where the pods ripen. It is a tufted creeping herb with yellow flowers; the leaves are radical, trifoliate, on long petioles, the leaflets oblong, the terminal one being stalked. This plant, interesting from the mode in which it ripens its seed, is celebrated as an article of diet along the western coast of Africa, where it is eaten both in a ripe state, and when unripe after being boiled. The plant has been introduced into Surinam and Brazil, it is supposed, by the slaves from the coast of Africa. It is called *mandobi* by the Brazilians.

VOCHYA'CEÆ, or VOCHYSIA'CEÆ, a natural order of plants belonging to Lindley's parietose group of polypetalous Exogens. The species belonging to this order are trees, with opposite branches, which, when young, are 4-cornered. The leaves are entire, mostly opposite, sometimes towards the extremities of the branches they are alternate, and are supplied with two stipules at their base. The inflorescence is usually terminal, in panicles or racemes, the pedicels bracteate, and the flowers irregular and united. The calyx is either free or slightly adherent to the ovary, with 4 or 5 sepals, and imbricate in æstivation. The sepals are combined at the base; the upper one calcarate, and often large and irregular in form. The petals are unequal, 1, 2, 3, or 5 in number, alternating with the segments of the calyx and inserted into their base. The stamens are from 1 to 5 in number, usually opposite the petals, in some cases alternate, arising from the bottom of the calyx, and for the most part sterile, generally only one being fertile, and bearing a single large ovate 4-celled anther. The ovary is superior or half-inferior, 3-celled; the style and stigma single. The fruit is capsular, being 3-cornered, 3-celled, 3-valved, the valves bursting along the middle. The seed is erect and without albumen; the embryo is straight inverted; the cotyledons are convoluted, large, leafy, and plaited; the radicle is short and superior.

De Candolle remarks on this order that it is 'at present but ill-understood; in habit and flower somewhat allied to Guttiferæ or Marcgraaviaceæ, but distinct from both in the stamens being inserted into the calyx; perhaps more directly connected with Combretaceæ, on account of the convolute cotyledons and inverted seeds; and even perhaps allied to some Onagraceæ, on account of the abortive solitary stamen.' Lindley suggests its affinity to Violaceæ as seen in its irregular flowers, 3-locular ovarium, and stipules; and also to Polygalaceæ, from which the calcarate flowers and ascending ovules principally distinguish it.

There are about forty species of this family altogether: they are all natives of equinoctial America, where they are found inhabiting antient forests, the banks of streams and sometimes the sides of mountains to a very considerable elevation. None of these trees are remarkable for their beauty or for their uses, but the striking irregularity of the structure of their flowers renders them objects of great interest to the botanist. The following synopsis of the genera, the descriptions of which are from Don, will indicate the more important variations in the structure of the floral organs of these plants.

Section I.—Ovarium free. Calyx 5-parted.

1. *Callisthene* (after Callisthenes, an antient philosopher). Upper sepal drawn out into a large spur at the base. Petal 1, obcordate. Stamen 1, without any rudiments of sterile ones. Valves of the capsule without a dissepiment; cells 1-2 seeded.

2. *Amphilochia* (after Amphilochus, an Athenian, who wrote on agriculture). Upper sepal drawn out into a short spur at the base. Petal 1, obcordate. Fertile stamen 1, usually without any rudiments of sterile ones. Valves of capsules bent so much as to form dissepiments; cells 1-2 seeded.

3. *Vochysia* (from *Vochya*, a Guiana name for some of the species). Upper sepal drawn out into a long spur. Petals 3, middle one the largest. Stamens 3, lateral ones sterile. Valves of capsule opening in the middle. Seed solitary in the cells, winged.

4. *Salvertia*. Upper lobe of calyx furnished with a spur at the base. Petals 5, 2 upper ones very narrow. Stamens 3, lateral ones sterile. Valves of capsule opening in the middle; cells 2-seeded.

5. *Qualea* (a Guiana name for some species). Upper sepal furnished with a spur at the base. Petals mostly 1, rarely 2. Stamens mostly 1, sometimes 2. Valves of capsule opening in the middle. Seeds winged.

Section II.—Ovary adnate to the calyx. Calyx 4-parted.

6. *Erisma*. One of the lobes of the calyx furnished with

a spur at the base. Petal 1. Stamens 5, 4 sterile and 1 fertile.

Doubtful genera.

7. *Lozonia.* Calyx with a ventricose tube and a 5-parted permanent limb. Petals wanting. Disk quadrangular, filling the bottom of the calyx. Stamen 1, small, inserted under the ovary. Capsule trigonal, 3-celled, 3-valved. Seeds 6. Stigmas 3, small, capitate.

8. *Agardhia* (after Charles Agardh, a distinguished Swedish botanist, author of a 'Synopsis Algarum,' &c.). Calyx of 3 sepals. Petals 5, convolute. Stamen 1, bearing a large 2-celled anther. Style 1. Fruit a drupe, oval, 3-celled, 3-valved.

9. *Schweiggeria* (after J. F. Schweigger, author of 'Flora Erlangensis'). Calyx of 3 sepals. Petals 3, one of which is spurred. Stamen 1. Pistil none.

Some of the species of Qualea and Salvertia bear flowers which give out a delicious odour. A species of Callisthene has also been observed to secrete a resinous fluid, which has not been analyzed.

VOET, GISBERT, the father, and Paul and Daniel, the sons, and John, the grandson, were distinguished members of the University of Utrecht, in the seventeenth century.

Gisbert Voet was born at Heusde on the 3rd of March, 1593; he studied at Leyden, with the character of a young man of great promise; and having taken orders, discharged the functions of minister in his native town till 1634. In that year he was appointed professor of theology and Oriental languages in the seminary of Utrecht, which was converted into a university two years later. Voet became the zealous advocate of the doctrines adopted by the Synod of Dort, nor did his controversial predilections confine themselves to this narrow field. He attacked vehemently the philosophy of Descartes, whom he designated alternately an atheist and a Jesuit, and whom he even went the length of accusing before the civil magistrate. His controversies with Cocceius, professor at Leyden, divided the Dutch theologicians into Voetians and Cocceians. In short no polemical adversary came amiss to him: Roman Catholic, philosopher, Arminian—he was ready to break a lance with any man who did not subscribe to the Calvinistic creed. He had on his arms at once Desmarets, Wolzogen, Regius, Schoockius, Dumoulin, Oesterga, &c. The incessant excitement of controversy appears to have agreed with him, for he lived to the advanced age of 87, outliving by several years all the other members of the Synod of Dort. A full list of his numerous publications, chiefly works of polemical theology, is given by Gaspar Burman, in his 'Trajectum Eruditum:' the principal are, 'Selectæ Disputationes Theologicæ,' 5 vols. 4to., Utrecht and Amsterdam, 1648-69; and 'Politica Ecclesiastica,' 4 vols. 4to., Amsterdam, 1663-76.

Paul Voet was also born at Heusde, on the 7th of June, 1619. He taught, at different times, logic, metaphysics, Greek, and civil law in the University of Utrecht. He published in 1654 a Harmony of the Gospels; and in 1655-57, 'Theologia Naturalis reformata.' Of his juridical works the most valuable, at least that which has carried with it the greatest authority, is the treatise 'De Statutis eorumque Concursu.' His other legal publications are—'De Duellis Licitis et Illicitis,' Utrecht, 1646; 'De Usu Juris Civilis et Canonici in Belgio Unito,' Utrecht, 1657; 'Disquisitio Juridica de Mobilibus et Immobilibus,' Utrecht, 1666, 'Commentarius ad Institutiones Juris,' Gorcum, 1668. It is in part owing to the time at which he lived, rendering his works the text-books of the young Scotch lawyers, the contemporaries of Stair and Mackenzie, that we find them so frequently quoted by the ablest Scotch lawyers previous to the commencement of the present century. Paul Voet published, in Dutch, a history of the family of Brederode, which has been translated into French; some controversial pamphlets defending his father; and notes on Musaeus, Callimachus, and Herodian.

Daniel Voet, son of Gisbert, and brother of Paul, was born at Heusde on the 31st of December, 1629, and died at Utrecht on the 3rd of October, 1660. He was professor of philosophy at Utrecht. He published several text-books: his 'Meletemeta Philosophica,' and his 'Physiologica, sive de Rerum Natura Libri vi.,' appeared at Amsterdam the year after his death, and were republished, with notes by Vries, in 1668.

John Voet, the son of Paul, was born at Utrecht on the 3rd of October, 1647. He was professor of law at Herborn, afterwards at Utrecht, and ultimately at Leyden, where he died on the 11th of September, 1714. His most esteemed work is his 'Commentarius in Pandectas,' published at Leyden in 1698, in 2 folio volumes. In 1670 he published a tract 'De Jure Militari;' in 1673 another, 'De Familia erciscunda;' and in 1683, at Leyden, a 'Compendium Juris.' He too, as well as his father, took the field in defence of Gisbert, the founder of the family.

John Eusebius Voet, inspector of the octrois at the Hague, and a Dutch physician, died there in 1778. He is mentioned with praise as a poet in Vries's history of Dutch poetry. His poems are lyrical in their form, and rather mystical in their contents. It does not appear that he belonged to the same family as the theologian, the jurists, and the philosopher.

VOGEL, THEODOR, a botanist of great promise, who perished in the expedition to the Niger, in the year 1841. He early devoted himself to the study of botany, and was a student at the University of Berlin, where he took his degree of doctor of philosophy. One of his earliest contributions to botanical science was a paper published, conjointly with Dr. Schleiden, on the development of albumen in leguminous plants. This paper bears the high character of all the later labours of Dr. Schleiden, and at the same time affords evidence that Vogel belonged to that school of physiological botanists who, from their minute knowledge of structure, are doing so much at the present day for the advancement of scientific botany. In a subsequent paper, entitled a 'Monograph of the Genus Cassia,' Vogel displayed his intimate knowledge of structure, as well as his powers of analysis, in unravelling the intricacies of that difficult genus of plants. In 1840, when it was determined to fit out an expedition to Africa, Captain Washington visited Germany for the sake of gaining cooperation, and Vogel was there recommended to him as a botanist likely to be of great service in the expedition. Vogel, who was then at Bonn, in the university of which place he had been appointed a teacher of botany, no sooner had the offer made him than he anxiously embraced it as affording him an opportunity of pursuing his favourite science in an unexplored region. After having visited England, where his knowledge of botany excited in the minds of those who knew him the warmest interest for his prosperous return, he sailed with the expedition for Africa, in July, 1841. The disastrous events of that ill-fated expedition are well known. Vogel was an early sufferer from the fever which carried off the majority of those who sailed, and although he recovered so far as to be able to reach Fernando Po, he sunk there from the effects of dysentery about six months after the time he had sailed from this country. He made the best use of the little time that he had health to collect plants, whilst on the coast of Africa, and his death seems to have been hastened by his anxiety to arrange and study them whilst in a convalescent state at Fernando Po. The results of these labours have not yet appeared. He was buried by the side of Captain Bird Allen, another of the unfortunate victims of this expedition.

VOGHE'RA, PROVINCIA DI, a Province of the Sardinian States, bounded on the north by the Po, which divides it from the province of Mortara and also from Austrian Lombardy, east by the duchy of Parma and Piacenza, south by the provinces of Tortona and Bobbio, and west by the province of Tortona. Its length from east to west is about 20 miles, and its breadth is about 15 miles. It lies mostly in the plain of the Po, but the southern part of the province stretches over the northern slope of the Ligurian Apennines, from which the Staffora and other torrents descend and cross the plain to join the Po. The population of the province of Voghera is about 92,000, distributed among 77 communes. The country produces much silk. (Serristori, *Statistica.*) The head town, Voghera (Vicus Iriæ), originated in a suburb of the antient town of Iria, which in the course of time superseded the town. Voghera was for a long time a dependency of Tortona, and a fief belonging to the family Del Pozzo. Charles Emmanuel III., king of Sardinia, purchased Voghera, and made it the capital of a province. Voghera has 11,000 inhabitants; it is an uninteresting-looking town; the only building in it worthy of notice is the collegiate church, which is of good architecture. Voghera is in a plain on the high road from Turin to Piacenza, Parma, and Modena, which follows the southern bank of the Po. The road from Genoa to Milan by Pavia leads also through Voghera.

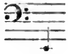
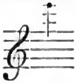
The other towns of the province of Voghera are, 1, Stradella, with 5000 inhabitants, situated on the high road from Voghera to Piacenza, and near the borders of the duchy of Parma; 2, Broni, or Bronni, a post-town on the same line of road, has 3000 inhabitants; 3, Catteggio, which has 2500 inhabitants. (*Calendario Sardo.*)

VOGULES. [RUSSIAN EMPIRE; SIBERIA.]

VOICE. The voice (from the Latin *vox*) is an audible sound produced in the larynx. The very different explanations which have been given of the manner in which the breath is vocalized in the larynx are accounted for by the circumstance of its being impossible to view the inside of the larynx when in an unmutilated state during vocalization. In the absence then of that positive, complete, and exact knowledge which such observation alone can furnish, we must be content with that approximation to truth which is arrived at by means of the present advanced knowledge of the production and modification of sound with which acoustic science supplies us [ACOUSTICS], applied to explain the minute mechanism of the larynx. [LARYNX.]

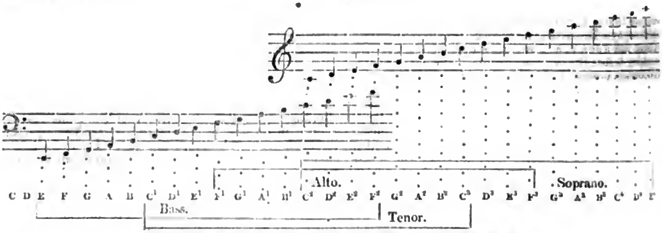
The design of the present article is to treat of the sounds of the human voice in its two great functions of Song and Speech. The nomenclature and notation of music [MUSIC] are here adopted, with such an extension, based upon the same principles, as is necessary for the purpose.

The infinite varieties of sounds heard in the human voice are all embraced under the general terms Pitch, Loudness, Quality, and Duration.

The scale of the human voice, from the lowest note of the bass to the highest note of the soprano, within which limits composers write vocal music, is four octaves in extent, viz. from *mi*, E,  in the bass cliff to *mi*, E^4,  in the treble cliff. There have been instances, but they are very rare, of voices capable of descending lower, and others of ascending higher than these limits. This scale of sounds is divided into *voce maschile* (male voice), which extends from *mi* (E) in the bass to *do* (C^3) in the treble cliff; and *voce feminile*, or *voce bianca* (female voice), which extends from *fa* (F^1) to *mi* (E^4) in the treble cliff.

The lower or male voice part of the scale is subdivided into Bass and Tenor, each containing two octaves: the bass extends from *mi* (E) to *fa* (F^2); and the tenor extends from *do* (C^1) to *do* (C^3).

The upper or female voice part of the scale is subdivided into Contralto and Soprano, each containing two octaves: the contralto extends from *fa* (F^1) to *fa* (F^3); and the soprano extends from *do* (C^2) to *mi* (E^4). These are the four scales within which musicians compose vocal music in each class of voice. The following diagram exhibits the scale of the human voice and the relation of its subdivisions:—

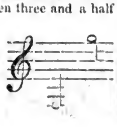

Alto.
Soprano.
C D E F G A B C¹ D¹ E¹ F¹ G¹ A¹ B¹ C² D² E² F² G² A² B² C³ D³ E³ F³ G³ A³ B³ C⁴ D⁴ E⁴
Bass.
Tenor.

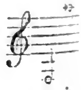
N.B. The terms *Alto*, *Contralto*, and *Counter-tenor* are the same.

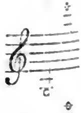
Intermediate between the bass and tenor is another male voice, extending from *la* (A) to *fa* (F^2), and termed the Barytone. And between the Contralto and the Soprano is another female voice, extending from *la* (A^1) to *la* (A^2), and termed the Mezzo-Soprano. The voices of eunuchs and boys are classed with female voices.

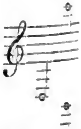
By reference to the diagram it will be seen that the scales of the several voices overlap each other in the great compass of the human voice; thus the bass overlaps the tenor eleven notes, so that the tenor descends to within five notes as low as the bass; while the bass ascends to within four notes as high as the tenor. Eleven notes are common to both bass and tenor scales, and any music whose variations of pitch are within the range of those eleven notes can be sung either by a tenor or a bass voice. It appears also by the diagram that a tenor voice reaches to within three notes as high as the contralto, and midway up the soprano compass; giving twelve notes common to the tenor and contralto, and eight notes common to the tenor and soprano scales, which explains the wide range of music which tenor voices can sing.

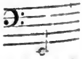
The ordinary compass of a voice is about twelve notes. Many singers' voices however extend to two octaves; some even beyond two, and some have reached three octaves. Catalani's compass is said to have been three and a half octaves.

The compass of Miss Dolby's voice is 

The compass of Mrs. Alfred Shaw's voice is 

The compass of Miss Clara Novello's voice is 

The compass of Malibran's voice was 

The compass of Mr. H. Phillips's voice is 

The compass of soprano and some other voices are divided into registers, of which there are two, viz. the natural and the falsetto. The former is termed in the Italian school *voce di petto*, which means chest voice; and the atter *voce di testa*, which means head voice. To these he Italians add another, which joins the two registers, and which somewhat partakes of the character of both; it is named the *mezzo falso*, or middle falsetto. The extreme upper notes of the falsetto are by some termed the *flautino*, or flute register, but this appears to be an unnecessary subdivision. The following table exhibits at a view the voices and their registers:—

Bass . . .	Chest			
Barytone .	Chest			
Tenor . . .	Chest. .	Mezzo-Falso.	Falsetto	
Contralto .	Chest. .	Mezzo-Falso.	Falsetto	
Mezzo-Soprano . .	Chest. .	Mezzo-Falso.	Falsetto	
Soprano. .	Chest. .	Mezzo-Falso.	Falsetto .	Flautino.

n this musical distribution of the registers of the voices here is no falsetto given to the basses. The bass and baritone voices however are both capable of extending heir compass by running up into a falsetto, and hence hey must each have a mezzo-falso register also. The faletto is commonly adopted by bass singers to imitate a woman's voice in the opera buffa.

There is also a feigned lower voice by which voices of ll kinds are able to descend lower in pitch than in the natural register. The term basso falsetto has been proposed to designate this voice, but the term lower falsetto is more accurate.

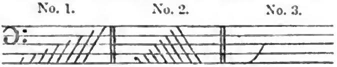
The Quality of the Voice.—Each person's voice has distinct quality or tone (*timbre* of French authors), by which it is recognised, even when singing in unison with others. The vagueness of the terms which are adopted to describe the qualities of the voice is much to be lamented: they are descriptive, such as nasal, guttural; descriptive by comparison with other sounds, as silvery, lute-like, musical; and metaphorically descriptive, as pure, clear, deep, brilliant, flexible, attractive, mellow, &c. These terms are too lax in their signification to be satisactory to the philosophical student of sound. Attempts have been made to connect certain qualities of the voice, as fulness with the bass, brilliancy with the soprano, &c., but without success. It is however quite true that those who are accustomed to hear much singing would mostly recognise any voice to be a bass, tenor, &c., although singng in unison with contraltos or sopranos. The essential distinction however between voices, as the bass and tenor, is not the quality, as stated by some physiological writers; for a voice is classed among basses or contraltos, as the case may be, solely in consequence of its compass lying within the limits of the bass or contralto scales.

Each voice has its natural and falsetto qualities, which belong respectively to the natural and falsetto registers. Besides these there is in song an improved quality named pure tone, and in speech a corresponding improved quality named the oratorical tone.

Song-voice.—The song-note is a musical sound of some ixed pitch in the musical scale. When a clear resonant voice produces a song-note, the accompanying harmonic sound may be heard just as it is with the sound of a vibrating string. The song-sounds of the human voice are arranged in the diatonic, chromatic, and enharmonic scales. Music.]

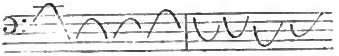
Speech-note.—The speech-note is not a true musical sound, because its pitch varies throughout its duration. These notes are termed slides, accents, and inflexions; and hey may be imitated on the violin by sliding a finger up he finger-board while the bow is applied. These notes may have an ascending or descending course in pitch, and sometimes they have both on a syllable. The varying pitch of a speech-note will be illustrated if the reader, with an intense feeling of inquiry utter aloud Hamlet's interrogatory, 'Pale, or red?' The speech-note on the word 'pale' will consist of an upward movement of the voice; while that on 'red' will be a downward movement, and in both words the voice will traverse so wide an interval of pitch as to be conspicuous to ordinary ears; while the cultivated perception of the musician will detect the voice moving through a less interval of pitch while he is uttering the word 'or' of the same sentence. And he who can record in musical notation the sounds which he hears will perceive the musical interval traversed in these vocal movements, and the place also of these speech-notes on the musical staff.

Speech-notes are of two kinds, viz. simple and compound. The simple consist of a single rising or falling movement of the voice. These movements may be of any extent from a semitone up to an octave. These differences of extent give eight simple rising speech-notes, viz. semitone, tone, third, fourth, fifth, sixth, seventh, octave, and as many simple falling speech-notes, making a total of sixteen distinct simple speech-notes. Mr. Steele accurately represented these notes by diagonal lines on the musical staff. The length of the line indicates the interval or dimension of the note; and its situation on the staff indicates its local pitch, as in the annexed diagram, Nos. 1 and 2, where the eight notes ascending and descending are in accordance with Mr. Steele's notation.



In these notes the sliding movement of the voice is equable, that is, it passes through equal spaces in equal times. The voice however in some notes is retarded in some part of its course, so that it passes through unequal spaces in equal times. Mr. Steele noted this retardation of the voice by slightly curving the diagonal line at the part, as in the above diagram, No. 3. Now the voice may be retarded at the beginning, at the middle, or at the end of a speech-note. And the voice may be accelerated in each of those parts. It will be seen that these modifications of pitch greatly multiply the number of speech-notes. And this number can be again greatly increased by successively giving to each note all the various forms of loudness of voice of which it is capable.

The compound speech-notes consist of both the simple vocal movements combined in a variety of circumflexes. Mr. Steele first noted them on the staff, from whose 'Prosodia Rationalis' the following diagram is copied:—



Numerous as are the varieties of circumflexes, they admit of classification, of which the following, partly taken from Dr. Rush, is adopted:—

The number of constituent vocal movements.

1. Simple circumflex consists of two movements.
2. Compound circumflex consists of three movements.
3. Continuous circumflex consists of more than three movements.

The direction of the first vocal movement.

1. Direct circumflex has the first an upward movement.
2. Inverted circumflex has the first a downward movement.

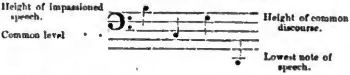
The dimension of the vocal movements.

1. Equal circumflex, each movement of equal dimension.
2. Unequal circumflex, each movement of unequal dimension.

In forming a circumflex speech-note, the voice may be retarded or accelerated in parts, as well as move equably through its course. The possible varieties of circumflex are almost infinite, and the number in ordinary use is far beyond what would be anticipated. This will account for the immense variety of sounds which are heard in human utterance, and which has been more a subject of declaration than thoughtful inquiry.

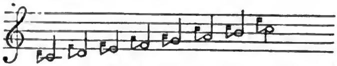
The Compass of the Speech-voice.—Several of the rhetoricians of antiquity speak of the changes of pitch of the voice seldom exceeding a fifth on any one syllable. Observations conducted for twenty years on the leading public speakers of the period have convinced the author of this article of the accuracy of this antient statement. It is true that higher intervals are used, even up to the octave, but very sparingly, and the fifth itself is of less common occurrence in oratory than the third.

Speech melodies seldom exceed the limits of an octave and a half. Whatever the speaker's key note may be, he seldom rises more than a fifth above it, or descends more than a fifth below it in pitch. A person's key note is generally somewhat below the middle of his compass; which circumstance enables most speakers to ascend an octave if required for the purpose of expression. The following notation of Mr. Steele's speaking compass, taken from the 'Prosodia Rationalis,' is interesting:—

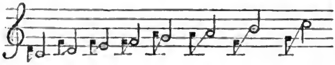


The voice of song (*i.e.* a song note) has been described as continuing throughout its duration on one level line of pitch. This description was necessary at the outset in order to state the essential distinction between song (musical) sounds and speech sounds.

Close observation however of the song notes of singers, especially in dramatic music, will show that many of the notes are not of uniform pitch, but that the voice rapidly slides through some interval, commonly of a tone, and the song note is produced at its summit. Let the slide be equal to a semiquaver, and the song note a minim, or rather to a minim minus the semiquaver slide, which is stolen from the quantity of the song note: many singers reach the several degrees of the scale by these slides according to the subjoined notation:—



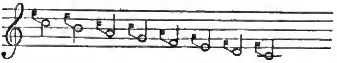
In taking the intervals from a fundamental note, it is not uncommon to hear a rapid slide through the entire interval, producing slide thirds, fourths, &c., and the song note at the summit of the slide, according to the subjoined notation:—



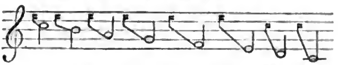
Similar notes often occur in the passionate intonation of the wide intervals of operatic music.

These song notes closely approximate to those speech notes in which the movement of the voice is retarded at the upper part of its ascent; and the approximation is the nearer in proportion to the greater retardation.

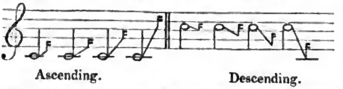
Sometimes the song note is preceded by a rapidly descending slide, which may be of the interval of a tone, as in the subjoined diagram:—



The slide is however frequently heard of greater intervals, especially in the musical expression of high excitement of feeling, as in the subjoined diagram:—

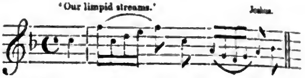


In song a rapid slide is occasionally heard after the song note. The slide may either rise or fall in pitch, and it may be of a tone or of a higher interval. The subjoined diagram is a notation of such notes, with a tone, 3rd, 5th, and 8ve, respectively, ascending and descending:—



The after-note of song (Nachschlag of the Germans) being always on the weak part of the measure, the slur from its principal to it produces a slide as above noted. These however are rarely heard.

A slur in song binds two or more notes into one continuous sound by a rapid slide of the voice, and thus approximates to a speech-note. In the following illustration, taken from Callcott's 'Grammar of Music,' p. 83, the effect of the first slur is similar to a circumflex speech-note, of equal intervals and inverted flexure; and the second slur is in effect similar to an unequal inverted circumflex:—



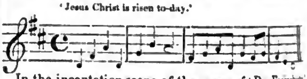
The preceding illustrations are given with a view of indicating, and not of exhausting the subject.

Of Recitative.—The notes of song, of speech, and the mixed notes above described, are all to be heard in recitative. The speech and the mixed notes predominate over the pure notes of song.

Of Chant.—In chant also are to be heard the notes of song, speech, and the mixed. The rapid part of the chant consists of speech-notes, and the concluding syllables of the clausular divisions are sung on song and mixed notes.

Of the kinds of Melody in Song, Speech, Recitative, and Chant.

Song.—A succession of single sounds forms a melody or tune. [Music.] A melody is said to proceed by *degrees* when its successive notes are in proximate degrees of the scale; and a melody proceeds by skips when it omits or leaps over one or more degrees of the scale. In general degrees and skips are intermixed, as in the melody of the Easter Hymn, taken from Callcott's 'Grammar':—

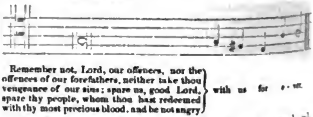


In the incantation scene of the opera of 'Der Freischütz' Weber has produced an effective melody, consisting of a repetition of the same sound. For the rhythmical arrangement of the sounds in song, see Music, Rhythm, and Prosody.

Speech.—In speech, as in song, a succession of simple sounds constitutes a melody. A speech-melody formed of speech-notes may proceed in all the varieties above described of song. [Elocution.] In vocal music the rhythmus of the language bends to that of the music: it is musical rhythmus. In speech-melodies however the rhythmus is that of the language.

Recitative.—Recitative melodies also proceed in all the varieties of song. In accompanied recitative, although the musical rhythmus takes the lead, yet the singer has much latitude, and in a great degree controls the musical rhythmus. In unaccompanied recitative the musical rhythmus entirely yields to the singer's ideas of what is appropriate to the required expression.

Chant.—Chant melodies also proceed in all the varieties of song. The ordinary melody however consists of a rapid iteration of the same note through a clause to the concluding four or five syllables, which are set in an appropriate succession. The following notation from the Litany, as arranged by the Rev. P. Penson, of Durham Cathedral, is quoted from the Leeds church-service, edited by Mr. Hill, the choir-master:—


Remember not, Lord, our offences, nor the offences of our forefathers, neither take thou vengeance of our sins; spare us, good Lord, spare thy people, whom thou hast redeemed with thy most precious blood, and be not angry
with us for e - ver.

The first note, *sol*, G, is rapidly reiterated on each syllable to the last five. The rhythmus is left to the taste and feeling of the chanter. In both recitative and chant the words are more distinctly uttered than in song. This arises from the structure of the notes, which are chiefly either speech-notes or those song-notes which approximate to them, in both of which distinct utterance is infinitely easier than in the notes of song.

Of the Voice as a Natural Language of the Emotions.—The voice, whether it be or be not united with verbal language, is expressive of the feelings. The voice is the language of the feelings, by which they manifest themselves to the ear without previous teaching; and when heard, are recognised and felt without teaching. The scream of terror, the shout of joy, the laugh of satisfaction, the laugh of sarcasm, the laugh of ridicule, are made by man and understood by his fellow-man wherever the one may be born and whatever may be the speech of the other. The voice is a natural, a universal language. Each mental attribute has its voice, which is in relation to that attribute; and whether that attribute forms part of the mind of man or brute, it instantly recognises the voice. The piercing cry of pain, the affrighting scream of terror, the voice of joy, are common to all, and recognised by all. The voices of the feelings, so far as pitch, duration, and loudness are concerned, are capable of notation. Dr. Colombat has attempted the notation of cries arising from various pains: and Dr. Burney has noted the song of several birds. The changes of pitch present the most remarkable changes in the voice; and on these mainly depend the voices of the feelings. The mind adopts changes of pitch to express its condition, and the interval of music is but a means of measuring, and thence imitating, that expression. A higher intensity of feeling increases the interval. Composers know this fact, and avail themselves of it in dramatic music. The pages of Handel, Mozart, Beethoven, Weber, and Rossini are full of illustrations of it. The 'Messiah,' the greatest of all musical compositions, abounds with degrees of intensity of the same feeling.

Music is language; it is tone-language; and besides expressing feeling, it is capable of conveying ideas with a greater or less degree of precision. It is not necessary to be a musician to know the approaching conclusion of a piece of music; nor to know at the end of a section that the end of the piece has not yet arrived, because the melody expresses it. The tone or melody of a question is familiar to us all in common discourse. The melody is imitated in music, of which several instances occur in the 'Messiah.' It must however be remarked that where the language assumes the grammatical form of interrogation, the melody of speech is of a less decided interrogative character. And these are the instances which occur in the 'Messiah.' The first five measures of the air, 'But who may abide the day of his coming?' and the four opening measures of 'Why do the nations so furiously rage together?' are both interrogative, and composed on the same general principle. These examples are quoted not to exhaust the instances, but to illustrate the subject.

The imperative character of the melody on the sentences, 'Lift it up: be not afraid: Behold your God;' in the air, 'O thou that tellest glad tidings to Zion,' will be at once perceived. We have not space to discuss and illustrate fully the conveyance of ideas by tone-language, and merely wish to state sufficient to draw attention to it as an important branch of musical expression. The high province of music is the expression of sentiment, and when it conveys ideas, they are not cold ones, but are warm, bright, and glowing with intensity of feeling. The theories of the conveyance of ideas and of the expression of feeling by music are yet wanting, and can be formed only upon a wide induction of facts selected from the works of those composers who have succeeded in those branches of music. That the minor mode and slow time are appropriate to pathetic subjects, and the major mode with quick time for joyful and vivacious subjects, are facts familiar to all who have studied music, so that ordinary composers are able o give a general cast of feeling; but it is the man of high genius only who can produce a musical whole which s composed of appropriately expressive parts. It is from he works of such men as Purcell, Handel, Haydn, Mozart, Beethoven, and Weber that such an induction should be made. In this way the few principles of composition would be increased and true music advanced; but it is beyond the power of principles and written rules in any rt to equalize unequal natural abilities.

Music is both an oral and a written language, and as a anguage it can be acquired by the multitude. Those who an read music (play or sing) are in a position in respect o music, like that in which those who can read verbal anguage are to verbal language. Those who know the cience of music so as to be able to compose music correctly are in an analogous position to those who know the grammar of verbal language so as to be able to write the language with grammatical correctness. Now multitudes know enough both of music and of grammar for this purpose; but something more is required to produce good music and a good book. Proper and well connected ideas, with appropriate and regulated feelings on the proposed subject, must exist, and a rhetorical wielding of music and language to convey those ideas and feelings with perspicuity and elegance. These high excellencies are rarely met with in an eminent degree; they are found in the highest excellence in Handel and Shakspere.

On the Improvement and Preservation of the Voice.—In the improvement of the song-voice the great objects to accomplish are, 1, To improve its quality in clearness and resonance. 2, To make every note in its compass equally pure. 3, To extend its compass both above and below. 4, To obtain power to produce a prolonged note on each degree of its compass. The accurate intonation of the scales is presupposed, for without that all training is musically useless. To effect these objects various systems of discipline are proposed, but none would be successful without the governing ear and voice of a master. The work however of Signor Crivelli stands in the foremost rank.

For the preservation of the song-voice the two great principles are, 1, To be temperate in all things, as eating, drinking, &c.; and, 2, Daily practice in the scales of music.

In the improvement of the speech-voice, the first great requisite is so to produce voice that it may not be injurious either to the general health or to the throat in particular. 2, To improve its quality in clearness and resonance throughout its compass. 3, To extend its compass both above and below. 4, To produce a prolonged speech-note on each degree of its compass. Hitherto these have not been systematically attempted, and not only have many orators been limited in their success by the defects of their voices, but many have been obliged to discontinue their avocations, especially the clergy, either from the injury to the throat or to the general health which public speaking produced. The primary object of elocutionary science, like that of physical, is to produce the greatest possible effect with the least expenditure of power; but, as in song-training, no system can be successful without the governing ear and voice of a master. The work entitled 'Cull on Public Reading' contains an outline of speech-voice training which has been eminently successful.

For the preservation of the speech-voice, as for the song-voice, temperance in all things is required. 2, Daily practice in the several forms of speech-note. By this means public speaking may become a pleasurable and healthful exercise.

The antient orators were accustomed to exercise their voices daily in preparatory declamations, and to ascend and descend through the compass of their voices by repeating about 500 lines of verse from memory. The antients adopted various medicaments and diets as beneficial to the voice, and certain nostrums are recommended at the present day; but let the orator depend more on a proper exercise of his organs, as the singer does on his, and he will be rewarded with cheerfulness and health.

VOID. [VACUUM.]

VOIGTLAND, or VOGTLAND (in Latin, *Terra Advocatorum*), is the land formerly possessed by the officers called Voigte (advocates) of the empire, the predecessors of the present princes and counts of Reuss. Their country comprehended the present circle of Voigtland in the kingdom of Saxony, the bailiwick of Weyda in the grand-duchy of Saxe-Weimar, the possessions of the princes and counts of Reuss, the lordship of Hof, now belonging to Bavaria, and the bailiwick of Ronneburg in the duchy of Saxe-Altenburg. From the eleventh century there were in this country officers called *Voigte* (*i.e.* advocates) of the Holy Roman empire. They were descended from Count Eckebrecht of Osterode, who lived from 950 to 979, and acquired the possession of Voigtland. All his successors took the name of Henry, and called themselves Voigte and lords of the Holy Roman empire, with the name of their territories, voigt and lord of Plauen, of Weyda, &c. Henry III. (the Red, 1086-1156) possessed the whole of Voigtland, which on his death was divided between his four sons, the founders of the four lines or branches of his house, all of which soon became extinct except that of Plauen, which in 1257 was divided into two lines, the elder and the younger. The latter is the still-flourishing house of Reuss. [Reuss.] Henry the Elder, of the elder line (which became extinct in 1572), voigt of Plauen, received in 1426 from the emperor Sigismund the rank of prince and the burgraviate of Meissen, which however with its dependencies was sold in 1434 by his son Henry II. to the margrave of Meissen. The descendants of Henry sold or mortgaged various portions of these possessions; and at length, in consequence of such a mortgage, the elector Augustus of Saxony, who in 1560 had acquired by purchase the bailiwick of Weyda, Arnshaugk, and Ziegenrück, purchased in 1569 the lordships of Plauen, Voigtsberg, and Pausa. They were formed into two circles: that of Neustadt, which was ceded to Prussia by the treaty between Prussia and Saxony concluded at Presburg, May 18, 1815; and the circle of Voigtland, which remained to Saxony. This circle has an area of 556 square miles and 193,500 inhabitants. It is divided into two bailiwicks—1, Voigtsberg, and, 2, Plauen with Pausa. According to the nature of the country, it is divided into two portions, the mountain and forest region, and the land region. The first is the mountainous and thickly wooded tract on both sides of the Mulda next the circle of the Erzgebirge, which it greatly resembles. The climate is cold and the soil stony; the only kind of grain produced is oats, and the only vegetables are potatoes, the cultivation of which has been much extended of late years. In the other portion, called the Land Region, the surface of the ground is covered with a rich mould, the climate is milder, and the weather and temperature much less variable. The highest mountains are the Schneckenstein and the Rammelsberg, on the frontiers of Bohemia: the principal rivers are the Elster, the Mulda, and the Gölsch. In the mountainous region agriculture is very limited, but in the valleys the industrious Saxons pursue most branches of agriculture; yet the country is on the whole too mountainous to produce sufficient corn and fruit for the population. Flax alone is raised in sufficient quantity. The circle has a very fine breed of horned cattle and sheep. Game and fish abound, and pearls are found in the Elster. One of the chief productions is timber, of which large quantities are exported. The minerals are copper, iron, alum, lime, and slate. The chief occupation of the inhabitants is the manufacture of linen, cotton, and woollen cloth, and especially of muslin, in which it is said that 30,000 workmen are employed. [Plauen.]

(Hassel, *Erdbeschreibung*, vol. iv.; *Das Königreich Sachsen;* W. von Schlieben; *Das Königreich Sachsen*, in Schütz, *Erdkunde*, vol. xx.; Brockhaus, *Conversations Lexicon;* K. H. Ludwig Politz, *Das Königreich Sachsen*.)

VOIRON. [Isere.]

VOISENON, CLAUDE HENRI FUSE'E DE, was born at the Château de Voisenon, near Melun, on the 8th of January, 1708. He was a younger son, and his delicate constitution rendering him unfit for a military career, his parents made him enter the church.

The future priest made his literary début by addressing in his eleventh year a poetical epistle to Voltaire, who complimented the author in return. A dramatic piece in one act, 'L'Heureuse Ressemblance,' which he produced in his twentieth year, meeting with a favourable reception, encouraged him to write for the stage. Three pieces, 'L'Ecole du Monde,' 'L'Ombre de Molière,' and 'Retour de l'Ombre de Molière,' were brought upon the stage by him with varying success. About this time he was involved in a duel with an officer whom he had offended by some joke. Hitherto Voisenon had refused to comply with the wish of his family that he should take orders: the conviction that he was in fault in this quarrel, and had wounded his innocent antagonist, pressed so heavily on his mind, that he entered a seminary.

He was barely ordained, when his relative M. Henriot, bishop of Boulogne, appointed him grand-vicar. On the death of the bishop, in 1741, the see was offered to Voisenon, who declined it on the ground that he who was unable to control himself was unfit to manage a bishopric. Cardinal Fleury, pleased with this disinterestedness, bestowed upon him the abbey of Jard, in which residence was not required. Voisenon, thus made possessor of a competency, gave himself up for the rest of his life to the world and its pleasures.

Voltaire introduced him to the Marquise du Chastelet. The wits who frequented the houses of the Comte de Caylus and the actress Quinault Dufresne received him with open arms. The Duc de la Vallière eagerly sought his company. His former success in writing for the stage led his friends to wish that he would resume his pen; but two years elapsed before the entreaties of Mademoiselle Quinault could overcome the misgivings of the 'ancien grand-vicaire' of Boulogne. She triumphed at length, and the 'Mariages assortis,' a comedy in verse, in three acts, was produced at the Italiens in 1744.

From 1744 to 1755 he composed a number of plays, of which 'La Coquette fixée,' which had a run of twenty-three successive nights, was the best. He produced on the stage or in print operas, oratorios, profane and licentious hymns, and at least one religious tract. In the midst of his dissolute life Voisenon was haunted incessantly with religious scruples. His naturally weak constitution broke down at last under his libertine indulgences. Apprehensive of death, he made a general confession; his confessor refused him absolution: Voisenon appealed to the pope, and with some difficulty, after paying a thousand crowns and engaging to repeat his breviary every morning, he was absolved. He kept his promise, but the regularity of his devotion contrasted strangely with the equal regularity of his dissipation.

In 1762 he became a candidate for admission into the Académie: he was elected, and delivered his inaugural address on the 22nd of January, 1763. He attended the meetings of that body with punctuality, and his wit and liveliness made him a favourite. In 1766 he was deputed to do the honours of the Academy to the duke of Brunswick, and in 1768 to the king of Denmark. In 1771 he was the director who admitted M. Roquelaure, bishop of Senlis, and a few days later the prince of Beauveau and the historian Gaillard. On all these occasions he gave free vent to his petulant wit. His face and figure, which have been compared to those of an ape, pointed his jests, and these solemnities elicited peals of laughter from the audience.

Notwithstanding his effrontery, the Abbé Voisenon lived long without enemies. He was perfectly good-natured, and appears to have acted among his irritable associates the part of a reconciler-general. He lost himself however after the fall of the Duc de Choiseul, who had patronised him, by his servile flattery of Madame du Barry and his ungrateful sarcasms against his former benefactor. Voisenon's friends fell off from him in disgust. The duke of Orleans refused to receive, and the prince of Conti turned his back upon him. He was insulted at the meetings of the Academy. He withdrew to his paternal château, where he died on the 22nd of November, 1775.

Besides his dramatic pieces and fugitive poetry, Voisenon published a number of tales, 'Anecdotes Littéraires,' and 'Fragmens Historiques.' Madame de Turpin, whom he was accustomed to call his secretary, was his literary executor. She published the complete works of Voisenon, prefaced by a eulogistic biography, in five 8vo. volumes. Laharpe, who said that these volumes reminded him of a butterfly crushed in a folio, published a selection, in one small volume, in 18mo. There is both point and elegance in the wit of Voisenon, though his mind was scarcely vigorous enough for a work of any extent. Notwithstanding his libertinism, he was unostentatiously benevolent, and on some occasions self-denying. His disgraceful conduct towards the Duc de Choiseul may be charitably ascribed to dotage.

(*Biographie Universelle.*)

VOITURE, VINCENT, a French writer in prose and verse, formerly of great reputation, was a native of Amiens, where he was born in 1598. His father was a wine-merchant, but, besides being a lover of good cheer, was an attendant upon the court, and well known to all the principal people there. Voiture himself was educated at Paris; two poems by him, one in Latin, the other in French, on the assassination of Henry IV., were published in a collection of pieces by members of the College of Calvi, in 1612; the same year appeared his 'Hymnus Virginis, seu Astrææ;' and it was at the College de Boncour that he made the acquaintance of M. d'Avaux, who afterwards, when he became superintendant of the finances, gave his friend the valuable place of one of his first clerks, making it at the same time a sinecure, the better to suit Voiture's tastes and habits. It is said to have been at the celebrated hotel of Madame de Rambouillet, where he was introduced by M. de Chaudebonne, that his wit and talent were first appreciated: Mademoiselle de Rambouillet is the Madame de Montausier who is so frequently celebrated in his letters and verses. He soon became a distinguished figure at court; and he spent the rest of his life in the society of the great, occasionally visiting foreign countries on some court mission. He appears to have been in England in 1633; one of his published letters in that year is dated from Dover. Before this he had been in Spain, where he was received with great distinction, and where he delighted the literary and fashionable circles of Madrid by penning verses in their own language, of such purity and apparent facility of style, that they were at first universally ascribed to Lope de Vega. From Spain he proceeded to Africa, to satisfy his curiosity by a view of that coast. He is stated to have paid two visits to Rome; and in 1638 he had the honour of being sent to Florence to announce to the grand-duke the birth of the dauphin, afterwards Louis XIV. Among the places he enjoyed at court were those of maître d'hôtel to the king, and introducteur des ambassadeurs to the duke of Orleans. He was elected a member of the French Academy in 1634, and of that of the Umoristi at Rome in 1638. He died in 1648.

With the exception of the early pieces already mentioned, and some stanzas addressed to Gaston of Orleans in 1614, Voiture printed nothing in his lifetime; but his French writings were collected after his death, and published at Paris in a quarto volume in 1650, by his nephew M. Etienne Martin de Pinchesne; and they have since been often reprinted. They consist of letters, poems, and a portion of a prose romance entitled 'L'Histoire d'Acidalis et de Zelide.' His Latin verses were first added in an edition of his works published at Paris, in 2 vols. 12mo., in 1729. He is also said to have written easily and correctly in the Italian language, as well as in French and Spanish. In his own day and for a long time after Voiture was universally regarded as the model of grace and spirit in writing; the inclination of more recent criticism has generally been to depreciate him, perhaps unduly. Voltaire remarks (*Siècle de Louis XIV.*) that he was the first example in France of what is called a bel-esprit; but that his writings have scarcely any other merit. He admits however that that sort of merit was then extremely rare; and he adds that some of Voiture's verses are very fine, though those deserving to be so styled are but few. The Abbé de Castres (*Siècles Littéraires*) allows that some of his letters may still be read with pleasure, but not the whole continuously. He complains that the wit is too ambitious and manifestly elaborate, as well as lavished with such prodigality as to dazzle and fatigue more than to please. The writer's constant affectation, the Abbé conceives, is such as to deprive him of all the charm of nature and variety. On the other hand, our own Pope, in a finished encomium on Voiture, sent along with a copy of his works to his friend Miss Blount, has said—

'His easy art may happy nature seem;
Trifles themselves are elegant in him.'

De Castres admits nevertheless that Voiture does not merit all the contempt which it had come to be customary to express for him; and that few writers furnish more examples of fineness and delicacy of thought. Boileau was an ardent admirer of Voiture, and has celebrated him as the great example of elegance of style in the preceding age. He must indeed be regarded as one of the reformers of French poetry—which he had the taste to seek to restore to the simple and cordial style of Marot from the pedantry and affectation into which it had subsequently degenerated; adding at the same time a polish and comparative exactness till then unexampled. He may in this way be considered as the founder of the style which was afterwards carried to perfection by La Fontaine. We had certainly nothing so good of the same kind in English poetry till Prior appeared. In his prose, his wit is often very brilliant and happy, and the diction is probably more flowing and regular than that of any preceding French writer. A conclusion to Voiture's unfinished romance has been written by the Sieur des Barres: it first appeared by itself at Paris in 1677; and it may be seen in an edition of his 'Lettres et autres Œuvres,' 2 vols. 12mo., Amsterdam, 1709, although the 'Biographie Universelle' says it was first published along with Voiture's romance in the Paris edition of 1713. There are at least two English translations of Voiture's Letters: one entitled 'Letters of Affairs, Love, and Courtship, written to several persons of honour and quality by the exquisite pen of M. de Voiture; Englished by J. D.' (*i.e.* J. Davies, as appears from the dedication), 2 vols. 8vo., London, 1657; the other, entitled 'The Works of Monsieur Voiture, translated by Mr. Dryden, Mr. Dennis, Dr. Drake, Mr. Cromwell, Mr. Cheke, Mr. Brown, Mr. Ozell, Mr. Webster; the third edition, revised and corrected throughout by the last edition printed at Paris; addressed to Miss Blount by Mr. Pope,' 2 vols. 12mo., London, 1736. But this is one of Curll's lying title-pages, and the book contains translations of only a very few of Voiture's poems. Among the translations however is one attributed to Pope, which could scarcely have been written by any one else ('Verses occasioned by Mr. Durfy's adding an &c. at the end of his name, in imitation of Voiture's verses on Neuf-Germain'). This translation of the Letters does not seem to be so good as that by Davies. Some of the best of Voiture's poems, preceded by a short sketch of his life, with several curious anecdotes illustrative of his character and habits, may be seen in the 5th volume (pp. 193-258) of the collection entitled 'Recueil des plus belles Pièces des Poëtes Français,' 6 tomes, 12mo., Paris, 1752. So lately as in 1806 there was published at Paris, in 2 vols. 12mo., a collection entitled 'Lettres Choisies de Voiture, Balsac, Montreuil, Pelisson, et Boursault.' The letters are preceded by a preliminary discourse and a biographical account of the writers; both anonymous, but known to be, the former by M. Vincent Campenon, the latter by M. Auger; and several both of his Letters and Poems are given in a 12mo. volume, entitled 'Œuvres Choisies de Marot, Malherbe, Voiture, et Segrais,' Paris, 1810. See also the 'Liste Alphabétique des Auteurs,' prefixed to Richelet's Dictionnaire; and Baillet, 'Jugemens des Savans,' iv. 248-250.

VOLA'NUS, A'NDREAS, a Polish Protestant author, who acquired great celebrity by his controversy with the Jesuits, and by whom he was attacked with the most bitter violence. He was born in 1530, in the province of Posen, but lived chiefly at Vilna, where he was pastor of the Reformed church, and where he died in 1610, at the age of eighty. Besides his controversy with the Jesuits, he wrote against the Socinians, and had theological disputations with the Lutherans, in which he displayed great talent and learning, but failed in his object, which was to bring about a union between the Augustan and the Helvetian confessions in Poland. Besides a great number of controversial works which he published, and which had in their time a great run in the country, as well as abroad, Volanus is advantageously known as a political writer by his work 'De Libertate Politica seu Civili,' Cracow, 1582.

VOLATILE OILS, &c. [OILS.]

VOLCA'NO. The situations on the globe where subterranean fires have made or found channels to the surface of the land or to the bed of the sea, are termed volcanoes. A volcano is merely the channel of upward communication from the subterranean fires; the mountain in which the volcano acts, and the extensive mounds and masses of ashes, lava, &c. which surround it, are the effect and the measure of the expansive mechanical forces which are relieved by the pouring forth of the streams of melted rocks, the showers of ashes, torrents of water, and jets of steam and gases which constitute the eruptions. By considering the nature of these solid, liquid, and gaseous substances, and the circumstances of their ejection, some progress may be made towards a chemical theory of the nature and origin of the subterranean fires; but to gain a proper notion of the mechanical forces set in action during volcanic excitement we must enter upon a larger inquiry:—the connection of earthquakes and volcanic eruptions, the relations of one volcanic district with another, especially as to coincidence or reciprocity in the times of their violent activity or remarkable repose; and the history not only of volcanic phenomena which are now in progress or have formerly happened in particular situations, but the general history of the effects of the disturbance of the internal heat during all geological periods and over all parts of the globe.

Has this extensive inquiry been followed out so completely and methodically as to justify a belief that the true theory of volcanoes is reduced, as several other branches of the great theory of nature have been, to a plain process of induction? That many geologists suppose so is evident from the decision with which their general speculations are advanced; but the student who desires to possess clear and systematic inferences without being troubled with contending hypotheses will find it necessary to class the phenomena as if the inquiry were very far from completion. The following views may aid his researches into this large and interesting subject.

Succession of Volcanic Phenomena.

A complete history of any one volcano, by showing us its origin, its alternations of rest and activity, its progress to decay and its final extinction, would furnish a sufficient base for a general theory of volcanic action: for the analogies among all burning mountains, as to form, structure, composition, and associated phenomena, are such as to warrant the application of a few general laws and one theory to them all. But we know not completely the succession of phenomena which have happened in any one volcano. We have indeed examples in abundance of new islands and new mountains being raised in our own days and giving forth flames: we have the history of Vesuvius as an intermitting volcano for nearly eighteen hundred, and that of Ætna for above two thousand three hundred years; and we may contemplate on the banks of the Rhine, in Hungary, and in Auvergne, the aspect of a country from which the subterranean fires appear to have withdrawn their forces before the origin of history. The birth, continued activity, decay, and extinction of volcanoes are phenomena seen in separate parts of the earth's surface, and acquire unity and consistence only by being rightly combined into a correct general view of volcanic action.

Earthquakes.—Previous to volcanic eruptions generally, whether these happen in old craters or burst up in new situations, earthquakes prevail, sometimes for a considerable period, in the vicinity of the volcano, and extend their terrors to considerable distances from it. Near to the centre of future violence springs have been known to fail and others to burst forth, and unusual noises have been heard. Previous to the year 1538 the Neapolitan shore had been disturbed by earthquakes for two years; and these symptoms of subterranean disturbance were succeeded by the rising of the Monte Nuovo (over the antient site of the Lucrine Lake) in the space of forty-eight hours.

Among the effects of great earthquakes are fissures in the crust of the earth, both in volcanic regions and in distant situations. In 1811 and 1812 the movements of the ground in the Valley of the Mississippi and in Caracas caused vast depressions and elevations, some of which remained so as permanently to affect the drainage and change the form of the surface. Some of the numerous fissures produced in Calabria by the earthquake of 1783 assumed a radiating form, and it is conjectured by Mr. Lyell that in these situations the ground was permanently raised. In 1669 the flanks of Ætna were fissured, and through the opening the Monte Rossi was raised, by ejections of ashes, &c., to the height of 450 feet. In 1759 the new volcano of Jorullo was formed on the plains west of Mexico, first by the swelling up of the ground, according to the account of Humboldt, 'in the shape of a bladder,' and then by the accumulation of ejected materials, into a mountain 1695 feet high.

By these instances, taken from situations far from other volcanoes (Jorullo), at points in the vicinity of active and extinct volcanoes (the Monte Nuovo), and on the slopes of a frequently burning cone (the Monte Rossi), it appears that generally the earliest observable fact in the history of volcanic phenomena is the opening of the ground—

a, Along a line of fissure. *b*, In a system of intersecting fissures. *c*. Or in a general tumefaction, precisely as happens among the effects of ordinary earthquakes. Such openings, when happening on land, constitute subaërial volcanoes; and when occurring in the bed of the sea they produce submarine volcanoes.

Volcanic action thus appears a local consequence of earthquakes, which are themselves the effect of a disturbance of the conditions of equilibrium among the masses which compose the globe for some depth from its surface. To determine a cause for such disturbances, and by consequence the true nature of earthquakes, is the great step to a general theory of volcanoes.

Eruptions.—When by some movement of the ground a channel is opened from the interior to the surface of the earth, a paroxysm of volcanic excitement follows, and an eruption happens through the new opening. There may be a slow outpouring of melted rock, pressed upwards against gravity by some internal force (as steam); or a violent upburst of clouds of scoriæ and ashes, mixed with larger stones; or a torrent of the same materials mixed with water, and constituting mud; or volumes of steam and gases of different sorts. But these are exactly the products, singly or in combination, which are delivered by long-established vents, and, as far as we can judge, the same have been yielded by volcanoes which probably became extinct before the historic æra of the human race: moreover, the volcanoes of all regions agree generally in this respect. Evidently, therefore, the condition of the interior parts of the earth, which are under the influence of volcanic excitement, is of a general and continuous nature, and must be supposed capable of interpretation by examination of the products and the circumstances of their extrication.

Mass of Volcanic Products.—Now the first thing which arrests the attention in regard to the circumstances which accompany the products of volcanic eruptions, is the enormous mass of materials ejected at particular points. In 48 hours, in 1538, the Monte Nuovo, 440 feet high, and 8000 feet in circumference, was thrown up in a place which may be regarded as a new vent of the Neapolitan volcanic region; in 1759 a new vent was opened west of Mexico, a new mountain (Jorullo) was thrown up to the height of 1695 feet, and an area of three or four miles was swelled up like a bladder. Between July and August, in 1831, the island of Sciacca had been raised from the sea-bed 100 fathoms deep, to a height of 107 feet above the sea, with a circumference of 3240 feet; in September its height was 100 to 230 feet, and its circumference 2300. In the winter of 1831-2 the whole vast heap of ashes had been dispersed by the waves, and nothing now remains of this shortlived volcano but a dangerous shoal. The lava currents from many volcanoes are of the same gigantic proportions. In 1737 Vesuvius poured forth 33,587,058 cubic feet; in 1794 46,098,766 cubic feet; and Ætna, in 1669, gave forth 93,838,950 cubic feet, which would make a considerable hill: for it would cover a space of ground one-quarter of a mile across, with a conical mound 180 feet high. The accumulated effects of two years' eruptions of Skäptaa Jökul, in Iceland, appear to have filled valleys and lakes and broad plains with floods of melted rock. The lava is said to have flowed in one direction 50 and in another 40 miles, with breadths of 15 and 7 miles respectively, and with a depth averaging about 100 feet, but in places reaching 600 feet. If these data have any claim to be regarded as fair approximations (they are so regarded by Mr. Lyell and other writers), the mass of lava poured out in two years by this *modern* volcano exceeds a hundredfold that of the Plutonic rocks which appear in the chain of the Malvern Hills. It would cover all the coal-fields of the British Islands with a plateau of basaltic rock 30 feet thick, or bury London under a mountain rivalling the cone of Teneriffe. The volume of muddy and watery eruptions from volcanoes can seldom be accurately measured. Humboldt speaks of mud eruptions, called 'Moya,' as frequent in the volcanic system of the Andes, and they are abundant enough to fill valleys and stop the channels of rivers.

From such data as can be collected there appears no sign of any general decay in the magnitude of the volcanic eruptions taken generally, though in respect to any particular volcano the contrary may be inferred.

Eruptive Forces.—If the quantity of matter ejected by volcanoes be taken as a measure of the *amount* of unbalanced pressure which required and obtained relief, the *force* with which it was ejected may be regarded as a measure of the *intensity* of this pressure. Accurate observations on this point are needed. If, as recorded by Sir W. Hamilton, stones were thrown so high above Vesuvius as to occupy 11 seconds of time in falling to the level of the crater, this gives an upward velocity of 350 feet in a second at the level of the crater, and a height of about 2000 feet; but the mountain being above 3000 feet high, we must estimate the pressure at the level of the sea as competent to sustain a column of matter of the ordinary weight of lava (say twice and a half that of water) nearly a mile in height. This would equal the pressure of between 300 and 400 atmospheres.

Lava which had flowed in 1798, was traced by Humboldt to the summit of the Peak of Teneriffe, and must therefore have been sustained (unless the lava were, as is probable, of a lighter kind) by double the pressure. These pressures appear great, but in no degree improbable if udged by the well-known effects of steam. A temperaure of 800° Fahr. would give the steam pressure for a height 2000 feet above the cone of Vesuvius; and so rapidly does this power augment with additional heat, that ess than 1000° Fahr. may be sufficient to give steam a force equal to balance the whole column of lava in the Peak of Teneriffe. Now these are temperatures which ppear to fall within the observed heats of some of the lava currents, for these have been found to melt silver and o perform heating effects greater than those of red-hot ron. Steam-power, generated by the admission of water o the hot interior parts of the earth, appears entirely adequate to the 'eruptive forces' actually witnessed in volcanoes. It is much in favour of this being really the agency employed, that we find in explosive eruptions such considerable bodies of aqueous vapour erupted during most parts of the paroxysm; that some eruptions have yielded ittle else than steam, and others chiefly hot water. Moreover, on considering attentively the distribution of volcanoes over the globe, we find the active volcanoes most requently by the side of the sea, or by other considerable bodies of water; and the extinct volcanoes in the vicinity of antient lakes, or desiccated branches of the antient ocean.

The general type of a volcanic eruption appears to be as follows:—The ground is rocked by frequent earthquakes; pecial movements and noises happen in and about the volcanic mountain; clouds of steam rise from the crater, followed and mixed with showers of ashes and scoriæ driven up by the exploding vapour and expanding gases; he tube of the crater becomes filled by melted matter, which undulates upward and downward with the irregular pressure of the steam and gases; these burst in large bubbles through it, scattering it into granular dust and ashes, ill the lava overtops or breaks through the loose conical walls of the crater, and flows abundantly, so as partially or wholly to relieve for a time the unbalanced internal pressure.

Volcanic Products.—The substances thrown out during volcanic eruptions, whether stony, liquid, or gaseous, dislose more or less completely the nature and condition of he interior masses of the globe. The lava or melted rock s generally referrible to a very small number of aggregaions, in which felspar, augite (or hornblende), and oxide f iron are the most important ingredients, the mass being modified by additional minerals, as leucite, idocrase, oliine, garnet, epidote, stilbite, heulandite, and many others. Uranium, copper, lead, arsenic, manganese, and sulphur lso occur in various proportions. The same substances ompose the ashes and scoriæ, the most prolific repositories of the rarer minerals being always in cavities of the lava or reniform aggregations.

In these particulars modern lava will bear comparison with antient Plutonic rocks, for they are composed of imilar mineral aggregates, modified by many of the same arer crystallizations, which mostly occur in the cavities of heir mass. The difference of most importance between Plutonic rocks (granite, &c.) and volcanic rocks (trachyte, &c.) is in the degree of their consolidation; and this difference appears quite intelligible by a comparison of the various appearance and character of lava which has ooled and become solid under different circumstances. Lava cooled in air under slight pressure is often cellular; ooled under the pressure of water (as in the case of the current which passed through Torre del Greco into the ea), it is more compact; much distended by gases and steam, it becomes vesicular pumice. We may therefore believe that lavas which remain and grow solid under great pressure about the internal base of the volcano are of a more dense nature than those which come to the surface, and may thus closely resemble, or be even identical with, some of the older Plutonic rocks, which thus regarded, and from other evidence, appear to be in fact *unerupted lavas.*

Besides abundance of water, the liquid products of volcanoes contain rarely sulphuric and muriatic acids; and among the substances of most interest in aiding to complete the theory of the chemical actions, are sublimations of common salt, and muriate of ammonia. The origin of these where the volcanoes are situated by the seaside cannot be doubtful. Boracic acid is another product of this kind, occurring in the crater of volcanoes. (Daubeny.)

The gaseous products of volcanoes are important in the investigation of the chemical theory of the igneous action. Besides the clouds of vapour of water (so abundant in eruptions, and so often productive of local rains), chlorine, azote, sulphuretted hydrogen, sulphurous acid, and carbonic acid, are the most common. The evolution of sulphuretted hydrogen (depositing sulphur), continues under various circumstances after other signs of activity have ceased in particular volcanic regions; and even after the craters have fallen in and become full of water, mineral springs, and springs rich in carbonic acid, flow with little variation for centuries, while azotized waters, rising to the surface along the lines of fissures more antient than any known volcanic systems, demonstrate the almost interminably slow process by which subterranean heat is excluded from the surface of the earth.

Chemical Hypothesis of Volcanic Action.—The nature of these various products, and the order in which they successively make their appearance, have been the basis for speculations as to the chemical processes going on in the interior of volcanic regions. Sir H. Davy's discovery of the metallic bases of the earths and alkalis, and of the extraordinary appetency for oxygen of several of these bases (potassium, sodium, &c.), suggested to that great chemical philosopher a new and ingenious hypothesis of volcanic action. Water admitted to some of the metallic bodies alluded to is instantly decomposed, and its oxygen absorbed, with an immediate and very remarkable evolution of heat and light, while the metals become earths or alkalis. The substances most abundant in volcanic products contain these earths, and these alkalis, viz. potash, soda, lime, silica, alumina, &c., in various combinations, evidently the result of successive crystallizations from a fluid mass. In this hypothesis it is assumed that the interior portions of the earth consist in part of the metallic bases of the earths and alkalis; that water is from time to time admitted to these, that violent combustion and great heat follow, that the oxides generated are melted together, constituting lava, while the hydrogen, and some of the water undecomposed, go off to form new combinations with sulphur, chlorine, carbonic acid, &c., which are liberated from previous states by the heat and the various chemical agencies set in activity. The power which raises the lava, and throws out the clouds of ashes and scoriæ, is the undecomposed and confined steam.

Whoever looks carefully at this hypothesis will find in it much that is admirable, and little that is open to strong objection, if it be regarded merely as a *theory of the eruption of volcanoes*, not as a theory of the changes in the condition of the interior parts of the globe of which volcanic action is one of the visible exponents.

It is some recommendation of this view that it seems to unite itself with a general and not improbable speculation regarding the origin of the more antient Plutonic rocks, which certainly must be supposed to have passed through a very similar series of changes to those which lava has undergone. Those rocks have the same bases as lava; it is the natural result of chemical reasoning, that the elements which are now combined in them existed at some earlier time in a separate state; the oxidated and melted granite crust of the earth is formed by the union of these elements, and, according to the hypothesis of Davy,[*] the new rocks which volcanoes yield are produced by a somewhat similar process of oxidation and fusion.

But this hypothesis was nevertheless neglected by its author for reasons which do not appear to have been fully stated by himself. It was taken up by Dr. Daubeny, and has been maintained by him with much perseverance and ingenuity of research as a sufficient 'Chemical Theory of Volcanoes.' We may call it the 'Hypothesis of Subterranean Oxidation,' and develop it, according to Dr. Daubeny, as follows:—

Below the surface, at a depth of a few miles, the interior of the earth is assumed to contain the earthy and alkaline metalloids, iron and other metals, sulphur and sulphuretted salts. Slow combustion happening amongst them, even under the continents, by slight additions of moisture and air, generates particular gases (nitrogen, carbonic acid, sulphuretted hydrogen, &c.); these rise and combine with springs which issue along lines of natural fissures, or are discovered in artificial wells, often giving to them a temperature higher than that of the country where they occur. Under the sea or large bodies of water, and especially along lines of sea-coast (where fissures may be supposed more numerous than elsewhere), water may be admitted to the interior more easily and in greater quantity, and may occasion phenomena of the same order, accompanied by other effects more powerful, rapid, and characteristic, until the process ceases for a while by the chokeing of the passages which admitted the water.

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[*] 'Phil. Trans.' 1828.

The water, decomposed by contact with the metalloids, yields its oxygen to them; the hydrogen is liberated, but not allowed to escape in great quantity alone, for it readily, under the influence of the heat, combines with sulphur into sulphuretted hydrogen, or, with the oxygen of atmospheric air (if any be present), reconstitutes water. Nitrogen is thus liberated, and may be conceived to pass off partly free, partly combined with hydrogen, so as to constitute ammonia, which again unites with chlorine (derived from the sea-water), and constitutes sal-ammoniac. While oxygen (derived from atmospheric air) is plentiful in the volcanic channels, the hydrogen will not unite with sulphur, which accordingly combines with oxygen into sulphurous acid. When the oxygen is consumed, sulphuretted hydrogen is formed in abundance, and predominates towards the close of the eruption, and even, by the aid of the residual internal heat operating on sulphur, is evolved for centuries after the volcanic violence is spent.

The evolution of chlorine is easily traced to a double decomposition of sea-salt; carbonic acid is supposed to rise from calcined limestone rocks; and specular iron-ore (fer oligiste) is a product of sublimation. Thus, in the opinion of Dr. Daubeny, all the main phenomena concomitant upon volcanic action seem to admit of explanation if we suppose, first, sea-water, and afterwards atmospheric air, admitted to considerable masses of metals, metalloids, sulphur, &c., the basis of the whole speculation being the abundant decomposition of water at a moderate depth below the surface of the earth. The views of Dr. Daubeny have been controverted by very eminent writers (as Dr. Davy, Prof. Bischof, and others) on particular points; but we are not aware of any attempt upon other assumptions quite so satisfactory as this of Dr. Daubeny to explain generally the *chemical products* of volcanic eruptions in the order of their occurrence.

Perhaps therefore we may concede to this hypothesis the probability that in the interior of the earth the metalloids exist in quantity sufficient to cause an abundant decomposition of water, and thus originate a given series of chemical changes such as are witnessed in volcanic eruptions. But before we accept it as a *general explanation* of volcanic disturbances, other classes of data than those furnished by chemical analysis must be brought into the reasoning.

An important circumstance in the general theory of volcanoes is the connection and reciprocal activity which exists underground between volcanic regions entirely separated on the surface, as between Sicily and Naples; between the Mediterranean volcanic region, taken generally, and the region of extinct (or long suspended) volcanic action in Asia. To this we must add another and larger series of facts regarding the extent and distribution of volcanic action on the surface.

Volcanic Regions and their Connection.—Volcanic regions, if estimated by the area over which the lava and ashes have been dispersed, constitute but a small portion (perhaps less than $\frac{1}{1000}$th part) of the surface of the globe; but in a survey of these regions we must include not only the active vents and extinct craters, but also 'large intermediate spaces where there is abundant evidence that the subterranean fire is at work continuously, for the ground is convulsed from time to time by earthquakes; gaseous vapours, especially carbonic acid gas, are disengaged plentifully from the soil; springs often issue at a very high temperature, and their waters are usually impregnated with the same mineral matters as are discharged by volcanoes during eruptions.' (Lyell, *Princ. of Geology*, book ii., ch. ix.)

To describe these districts would be entirely foreign to the purpose of this essay, but we may by a simple classification show how much of the grandest features of physical geography is due to volcanic disturbance.

European Volcanic Districts.—The Icelandic volcanoes, remarkable for abundant lava streams; the Azores, amongst which new islands have been thrown up; Sicily, including Ætna and the vanished island of Sciacca; the Lipari Isles, with Stromboli always burning; the Neapolitan tract, including Vesuvius; Ischia and the Ponza Isles; Santorin and some neighbouring islets. The above are all considered as *active* volcanic centres, and have been subject to eruptions in historical times. The *extinct* volcanic systems of Europe are the trachytic domes in the centre of France (Auvergne, the Vivarais, &c.), the Eifel country, the Seven Mountains, and other trachytic and basaltic parts along the Rhine; the Westerwald, Vogelsgebirge, Rhöngebirge, Kaiserstuhl, and many other scattered basaltic hills in the middle of Germany; Hungary, Transylvania, both remarkably rich in trachytes and pearlstones; the Gleichenberg in Styria. In Italy, the Euganean hills and other smaller points appear in the north of Italy; while between Rome and Naples large extinct craters occur, and connect Mount Albano with Vesuvius. (Daubeny.)

African Volcanic Districts.—These are chiefly in the islands, which are nearly all volcanic, though, as at St. Helena, the action has long been extinct; or, as in the Canary Isles, the localities once devastated now enjoy immunity through the great safety-valve of Teneriffe. (Von Buch.) On the continent the traces of volcanic action appear in the mountainous tracts adjoining the Red Sea and in the chain of the Atlas.

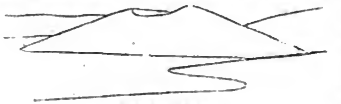
Asiatic Volcanic Districts.—Mixed active and extinct volcanic mountains occur about the Persian Gulf, the Red Sea, and the Dead Sea, in the vicinity of Smyrna, in the Caucasus (especially in Mount Ararat), and in the Elburz Mountains, including Demavend. These are, as appear, detached points of more or less decayed, though once powerful action, fed by inland seas. On the southern and eastern shores of Asia the subterranean energies are still unsubdued, and constitute a long chain of lofty islands and promontories from Barren Island in the Bay of Bengal, through the length of Sumatra and Java, by Bally, Sumbawa, Flores, Celebes, Sangir, Mindanao, [illegible] Luçon, Formosa, Loochoo, Japan, the Kurilian Isles, the magnificent mountains of Kamchatka examined by Erman, and the line of the Aleutian Isles, to Alaschka and the western coast of North America.

American Volcanic Districts.—The Rocky Mountains show many marks of antient volcanic action, and serve incompletely to connect the long Asiatic line just described with another enormous volcanic system running through California and Mexico, interrupted at the isthmus of Darien, but continued through Pasto, Popayan, Quito, Peru, and Chili, to Tierra del Fuego. This mighty range of mountains is everywhere parallel to the sea, being only crossed by the line of Mexican volcanoes, which includes the new mountain of Jorullo, and passes perhaps from the West Indies to the Revillagigedo Isles. The volcanic vents are unequally distributed along the great Cordillera: one in California, five in Mexico, and above twenty between this and the isthmus of Darien. South of this point the volcanoes are few, but mostly of prodigious grandeur and frequent activity, the fire issuing from one or other of the mountains, which, according to Humboldt and Darwin, are all parts of one grand swollen-up mass—supporting Cotopaxi, Antisana, Tunguragua and other huge cones. Only one active volcano occurs in Peru, but nineteen are active at frequent intervals in Chili, and one (Villarica) burns almost uninterruptedly. Most of the West Indian Islands are volcanic, or partly volcanic and partly calcareous, the limestone being mostly due to the growth of corals, perhaps on the craters or round the slopes of volcanic mounds. A similar view appears applicable to the numerous groups of islands in the Pacific Ocean, some of which, as the Ladrone Isles and Hawaii, are lofty and active volcanoes.

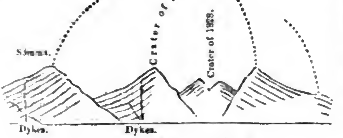
In general the Banda Isles, New Guinea, New Britain, the New Hebrides, Norfolk Island and St. Philip, the Friendly, the Society, and the Sandwich Islands are princilly of volcanic origin. The low lagoon islands, described Mr. Stutchbury (*Journal of the Bristol Institution*) deriving this form from the growth of coral, have been ought to be so many points of volcanic mounds, but it s been suggested by Darwin (*Geol. Proceedings*) that y are points of subsided land, on which the zoophyta ached themselves. Western Australia contains basaltic d other volcanic accumulations.

The philosophic investigator of the volcanic system the Canaries (Von Buch) has arranged the groups volcanoes, which have thus been briefly sketched, to two systems. 1, Central Volcanic Systems, where e vents are grouped round some principal cone, as tna, or arranged in an expanded area, as Iceland. 2, near Volcanic Systems, as the grand chain of Asiatic les and the lofty range of the Andes; and this view is rhaps of the more importance, because it is applicable the antient Plutonic rocks, which, from other considerans, we have inferred to be of the nature of unerupted va. Thus the Sienitic *line* of the Malvern Hills may contrasted with the scattered *groups* of traps about harnwood Forest and the country north of the Cheviot lills.

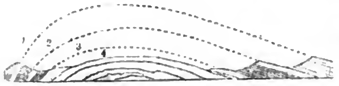
In the one case the crust of the earth has yielded to ressure and has been broken in many places near a certin point; in the other it has yielded along a certain line f weakness in the rocks. Von Buch imagined that the *entral* volcanic systems, like those of the Mont d'Or and he Plomb du Cantal in France, had been originally formed y an uplifting of the ground in a rudely dome-shaped levation (*Erhebungs-cratere*); while along the linear olcanoes a great fault had occurred. Exactly similar uppositions have been employed for the more antient xamples of unerupted Plutonic rocks; but in each case here is a part certain, viz. the fracture along the line, and a part disputable, viz. the upheaval in a dome. Mr. Lyell is indisposed to admit in any case the origin of a volcanic vent by upheaval in a dome-like figure; he even dissents from the opinion or narration of Humboldt already mentioned respecting Jorullo, and from the conclusion of De Beaumont and Dufrenoy regarding the Mont d'Or and the Plomb du Cantal. This is a point which would be of little consequence, but for the interest justly attached to any inference concerning the *origin* of volcanic phenomena. That there have been some rudely dome-shaped elevations in the older strata, in connection with disturbances of the interior of the globe, is evident to any one who has studied the strata in the vicinity of Woolhope, described by Mr. Murchison, of which the subjoined cut gives a cross-section. That the structure of such stratified domes of elevation is entirely different from that of a volcanic cone of eruption is evident by contrasting with the former figure the section across Vesuvius and the profile of the crateriform Monte Nuovo. Some further information on this head appears under the article STRATIFICATION, and upon the whole it is certain that in respect of a volcanic mountain or region, whose internal structure is sufficiently exposed, there are characteristic marks by which the existence of 'craters of elevation' can be affirmatively proved, if any such craters exist. Von Buch, De Beaumont, Professor Forbes, and others agree in ascribing this origin to some of the mountains in central France, and apparently on sufficient evidence. It is however not a phenomenon admitting of frequent citation. Now the districts thus classed together are not only related by geographical proximity, but have some real subterranean as well as apparent superficial connection. Humboldt and Darwin speak confidently of the great volcanic regions of the Andes as one grand system of subterranean activity; though the manifestations of this at the surface offer local peculiarities, both as to time and circumstances. Mr. Darwin has been led by the investigation of the volcanoes and earthquakes of the Cordilleras of the Andes to regard them all as depending primarily on the disturbance of a vast internal sea of melted rock spread below a large part of South America.



Monte Nuovo, 440 feet.



Vesuvius.



Woolhope Elevation.

1, Line of the Aymestry limestone; 2, line of the Wenlock limestone; 3, line of the Woolhope limestone; 4, line of the Caradoc sandstone.

Other conclusions, equally on a large scale, which have been drawn by M. de Beaumont from other classes of phenomena, have a direct bearing on this subject. M. de Beaumont has inferred that the principal mountain-ranges throughout the world have their several geological dates determinable by comparing the positions of the disturbed and the undisturbed strata in and around them: that to each great period of fractures in the earth's crust belongs a certain prevalent direction in which those fractures happened; and though this view may be subject to particular objections and restrictions, there is this great truth in it, that the several systematic fractures which it professes to refer to one certain geological date have each an assignable date. This date being assigned, we find that the earth's crust has in antient geological times been broken by lines of fracture or bent into flexures, 10, 50, 100, or several hundred miles long, and this often (there are many examples in the British Isles) with no unusual exhibition of really volcanic rock on the line, and even with little appearance of unerupted granite or sienite. These great fractures traverse nearly all regions, with no special reference to active or extinct volcanoes, and it is clear that they are due to a general cause, which has been in operation through all past geological periods, and which produced effects exactly comparable in kind, if greater in degree, to those now performed by modern earthquakes. But if we consider the account of the effects of the great Lisbon earthquake in 1755, which extended over Europe, changing momentarily the level of the land, raising waves 60 feet high at Cadiz, and 18 feet at Madeira, and sensible disturbance in the West Indies and Loch Fyne; or the narratives of the Chilian earthquakes in 1822 and 1835, the former of which raised the sea-shore for 100 miles, and the latter rent and shattered the entire provinces of Canqueres and Concepcion in every direction—it will remain very doubtful in our minds whether the internal power to which earthquakes owe their force has really decreased, or the violence of the earthquake been moderated and relieved by the intermitting action of volcanoes. Mr. Darwin speaks confidently of earthquakes and volcanic eruptions in South America as parts of the same phenomenon, now one and then the other, or both together, but at different points, relieving the pressure on the 'internal sea of molten rock;' and this view, which is the largest, appears at the same time the simplest, and best founded, of all the postulates for a general theory of volcanoes.

This able writer has indeed by a simple inference brought us at once to the basis of this theory. He has inferred that the primary shock of an earthquake is caused by a violent rending of the strata, which on the coast of Chili and Peru seems generally to occur at the bottom of the neighbouring sea.

Here then we take our basis of a general theory of volcanic actions. The earth's crust is subject to fractures, and has always been subject to fractures on a great scale: below the surface of the earth is now, and was in antient geological periods, an internal sea of molten rock; this sea is agitated and thrown bodily from its place by the rending of the strata: *a wave of translation* (not an ordinary undulation) is generated in the liquid mass, which passes rapidly onwards and moves the land on its crest, in a given direction; this is the earthquake. A portion of the melted rock is forced by the general pressure into cavities of the rocks, or spread out in irregular sheets on the bed of the sea; these are the dykes and interposed beds of Plutonic rock: to some part of the internal hot fluid water finds access, and the steam which is generated and confined supports local columns of melted rock, in particular fissures of the earth's crust, till the lava finds vent and flows to the surface, or is driven up in dust and scoriæ by the violent extrication of the vapour; this is the local volcanic action. As to the composition of that internal sea of melted rock, we may admit it to contain unoxidized metalloids, if by this means we can better explain the peculiar chemical nature of the products which come to the surface; and thus we find at last only one condition remaining to be satisfied, viz. the condition of a continual and progressive destruction of the equilibrium of the internal masses of the earth, which causes the violent rending of the strata antecedent to earthquakes and volcanoes. On this point we need not enlarge. The general progress of geological and physical science has rendered it very probable that the disturbance of the equilibrium of the earth's internal masses, which has at so many geological epochs been exalted to an intensity equal to sink and raise hundreds of miles square, and to fold into complicated contortions the seemingly solid crust of the globe, is due simply to a slow change and gradual diminution of the earth's internal heat. Great fractures, Plutonic rocks, and volcanic accumulations are of all geological ages; but as our existing land is, in respect of a very large part of its surface, of very recent date, and volcanic cones of loose materials cannot withstand the wasting action of the sea, it is no wonder that the antiquity of volcanoes, if judged only by the relation of volcanic products visible on the land to the stratified crust of the earth, appears much inferior to that of the Plutonic rocks, which were formed among the strata of every age, under circumstances which admitted of their being preserved. But if we more closely study this matter, and compare marine volcanic sediments, such as have been spread by the waves round the base of Sciacca or Sabrina, with the 'trappean' sandstones described by Mr. Murchison interposed amongst the Silurian strata, we shall perceive that local volcanic excitement consequent on general changes in the internal condition of the earth is a phenomenon of all geological periods.

(The reader may consult Daubeny *On Volcanoes;* Lyell, *Principles of Geology;* Darwin, *Geological Proceedings, &c.;* De la Beche, *Geological Manual;* Caldcleugh, in *Philosophical Transactions;* Humboldt's *Travels* and *Treatise on Rocks;* Von Buch *On the Canary Islands;* De Beaumont and Dufrenoy *On Auvergne;* Beudant, *Hungary;* D'Aubuisson's *Geology;* Bischof *On Mineral Waters;* Rogers, 'On the Apallachian Chain,' in *Reports of Brit. Assoc.*, 1842; Mitchell, 'On Earthquakes,' *Phil. Trans.*, 1760.)

VOLGA, THE, called by the Tartars *Ethel*, that is, 'the bountiful,' is the longest river, and, with the exception of the Danube, has the largest volume of water of any river in Europe; and its entire course is within the Russian empire. Geographers differ considerably respecting the length of its course. Hassel states it as about 1900 miles; Hörschelmann and others as 2000; and Schubert 2600. It rises in 57° N. lat., on the frontier of the governments of Twer and Novgorod, near the village of Wochina-Werchowie, issuing from a small lake formed by several springs, and it flows through the lakes of Oselok, Plara, and Volga, which it quits about 90 miles above Twer. Near Ostuschkof it receives the Selicharowka, which issues from lake Seeliger, and attains the breadth of 150 feet; at Rshew-Vladimirow it becomes navigable for small boats, and at Twer, where it is 700 feet broad, for large barges. Having traversed the government of Twer in an easterly direction, it turns to the north-east to Yaroslaw, then south-eastwards to Kostroma and to Nischnei-Novgorod, where it receives the Oka; thence to Casan, where, having been joined by the Kama, it becomes 1000 yards broad, and having passed Simbirsk, Saratow, and Astrachan, it divides into eight branches, which enclose 70 islands, and discharges itself by 65 mouths into the Caspian Sea, to which it is computed to bring, says Stein, 1,000,000,000 cubic feet of water in an hour. The rivers which join it, with the exception of the Oka, before it reaches Casan, are of no great magnitude; but the Kama, which joins it at Casan, after a course of 1000 miles, makes a vast accession to its waters.

The Volga is of the utmost importance for the facility which it affords to the trade of the interior of the empire, and also to its foreign commerce; the Russian government having, by a judicious system of canal navigation, so connected the various navigable rivers, that the Polar Sea communicates with the Caspian by a navigation of 4000 miles on the Dwina, the Volga, and canals; and thus goods may be sent by water from St. Petersburg to Selenginsk, in the government of Irkutsk, in Siberia (about the same distance), with only a short interruption beyond Yakutsk.

The banks of the Volga are extremely fertile, even the yet uncultivated parts; and there is no other part of Russia where so much oak timber grows as in the vicinity of this river. The navigation of the Volga is much obstructed, in the dry season of the year, by shallows and islands; but in May and June the melting of the snow and ice swells its waters, and often causes extensive inundations. At this season its depth is so increased that large ships can pass over the sand-banks and low islands (which are then completely under water), and descend it in safety from Twer to Astrachan. The Volga, especially from Astrachan to the Caspian, is more abundant in fish than perhaps any other river in the world. Immense numbers penetrate from the Caspian Sea to a considerable distance into the several mouths of the Volga, and many thousand small vessels are employed in the fisheries. The fish taken in the largest quantities are sturgeon, carp, and pike of extraordinary size. Caviar is made of the roe of one species of sturgeon, and isinglass from the sounds and entrails of another, which is called by the Russians Beluga. Seals also come from the Caspian into the mouths of the Volga, where they are taken.

(Hassel, *Das Russische Reich in Europa;* Stein's *Handbuch*, by Hörschelmann; Broekhaus, *Conversations Lexicon;* Stein's *Lexicon.*)

VOLGSK. [SARATOW.]

VOLHYNIA (in Polish, *Wolynsk*), a government of West Russia, comprehends the antient Polish province of that name, which was taken from Poland in 1793 and 1795, and some portions of the antient palatinate of Kiew. It is one of the few governments of Russia which have retained the provincial name, and are not called after a town. It lies between 49° 40′ and 52° N. lat. and 23° 40′ and 29° 24′ E. long. It is bounded on the north-west by Grodno, on the north by Minsk, on the east by Kiew, and on the south by Podolia, and on the west by Galicia and Poland. Its area is 28,300 square miles, divided into twelve circles.

The country is an elevated level extending at the foot of the Carpathian chain. The northern and larger portion has no mountains, but on the northern frontier there are extensive peat moors and morasses, and where there are hills they are clothed with the finest forests, chiefly of pine, though there are some which consist entirely of oaks, beeches, and limes. The southern portion is undulating, and has two small mountain-ridges which enter it from Podolia and decline towards the centre of the province. These chains of mountains, or rather hills, for their highest points are not 300 feet above the level of the sea, are covered with forests, and are to be considered as the extreme offsets of the Carpathians on this side. In the southern district they rise to the plateau called, by Eichwald, Awratyn, which he considers as the highest part of Volhynia, to which some give an elevation of 1000 feet. This plateau extends from Awratyn to Bieloserka (from the north to the south-west) for about one degree: but its breadth is small; its importance however, says Eichwald, may be judged of when we know that it forms the watershed between the Baltic and the Euxine: the rivers that rise on its northern declivity flow to the Baltic, and those rising on the south declivity, to the Euxine: the latter are the more considerable, but there is no great river in the government. The largest lakes are in the vicinity of Syak; but even these are of small importance, and rather resemble large ponds, of which there are great numbers. There are several mineral-springs, of which however no use is made. The climate resembles that of Southern Germany, and the seasons are the same, only that the winter is rather more severe, and the night frosts protracted to a later period, so that the rivers are every year frozen. Epidemic diseases are rare, and there are no prevalent endemics except the *Plica Polonica;* but a murrain often prevails among the cattle, and swarms of locusts periodically desolate extensive tracts.

Productions, Agriculture, Manufactures, and Trade.—Volhynia is one of the most fertile provinces of the Russian empire, and there is perhaps no other in which agriculture is so general and so flourishing; ample harvests constantly reward the labour of the farmer; a general failure of the crops scarcely occurs twice or thrice in a century; and partial or local failures have no influence, since, notwithstanding the great consumption for the people, the cattle, and the distilleries, there is still a large annual surplus. But it is not to be inferred that the people are good farmers; they do not manure and till their fields any better than the Poles in general; their farming implements are equally rude, and the only advantage they have over them is perhaps that their cattle are better fed. The rich crops of grain are to be attributed to the fertile soil. In the northern border, where there are many marshes, there are the most luxuriant pastures, in which the grass is so high as almost to hide the smaller cattle (sheep and goats) that feed in them. Hassel says that in ordinary years the land yields tenfold. Besides rye, barley of several kinds, oats, millet (which thrives especially in the heavy marshlands), the farmers cultivate several species of wheat of the finest quality, which is heavier and more farinaceous than that produced in any other part of Poland (meaning Poland in its antient extent). The annual produce is about four and in some years five millions of chetwerts: the surplus, after deducting the seed-corn for the following year and that consumed in the province, is seldom much less than a million of chetwerts, and sometimes more. Flax and hemp are grown in great abundance, and here and there rapeseed, tobacco, and pulse, but only for home consumption: linseed, hempseed, and oil are exported. Horticulture is not much attended to; however all the ordinary vegetables are cultivated in the gardens, and in those of the nobles all such kinds of vegetables as are produced in Germany. In some parts mustard, saffron, and capsicum are grown; hops are generally cultivated, tobacco in the gardens, and in the fields and meadows the people gather chamomile, creeping panic-grass (*Panicum dactylon, Manne de Pologne*), and wild asparagus. Most kinds of fruits would suit the climate, but the better kinds are seen only in the gardens of the nobles: the peasants have apples, pears, cherries, and plums, from which they obtain liqueurs and brandy; but they are of inferior kinds.

The forests, especially in the north and north-eastern parts, are very extensive; they are partly of firs, partly of other trees. Great quantities of timber and fire-wood are conveyed to the Dnieper, partly by rafts, partly by land-carriage; the forests also furnish much pitch, tar, charcoal, and potash. The wild animals found in them are stags, elks, fallow-deer, wild boars, hares, squirrels, martens, polecats, weasels, beavers, and otters, a few bears, lynxes, and wild-cats, and many wolves and foxes. It is said that the European bison is still occasionally seen in the north-western forests. [Bison.] Wild berries of various kinds abound, and truffles and mushrooms are commonly met with.

The rich pastures are very favourable to the breeding of cattle. The Volhynian oxen are fine animals, and great numbers are exported. The management of the dairy is not well understood, and the butter and cheese produced are scarcely sufficient. The horse, when proper attention is paid to it, is larger and stronger than the other Polish horses, though of the same breed; the studs of the nobility furnish horses for the heavy cavalry, but the horses of the peasants and poor Jews are in general far inferior. The sheep are of the Polish or German breed, and some rich landowners have introduced merinos with great advantage. The farmer has fewer goats than swine; the poultry is of the ordinary kinds; they have very great numbers of bees, and the honey is celebrated for its good quality. The rivers furnish abundance of fish, and on all the estates there are regular carp-ponds.

The only mineral is bog-iron: there are saltpetre, stone for building, and millstones, all which are exported; potters' clay, porcelain clay, and limestone.

Though Volhynia is naturally an agricultural country, it is further advanced in many branches of manufacturing industry than any other of the dismembered Polish provinces. Not only do the women in the villages knit, spin, and make coarse linen and woollen cloth, while the men prepare potash, pitch, tar, and charcoal, but the number of manufactories, properly so called, which in 1808 was 67, and in 1834 (according to Schnitzler) 211, is now (1843) nearly 300. The principal articles are linen, leather, woollen-cloths, earthenware, porcelain, and paper.

Volhynia is not favourably situated for commerce, as it has no large navigable rivers; but the Dnieper is near enough to afford an easy communication with Odessa. The articles exported are the natural productions, which have been already enumerated, and some manufactured goods. The cattle, horses, honey, and wax find a ready market in Austria and Poland, whither they are conveyed by the Jews, who have the whole trade of the province in their hands. There are great fairs at Dubno and Ostrog.

The population consists of—1. Rusniaks, who are the majority, almost all the peasants being of that branch, which, though evidently Russian, cannot well be comprehended either in the Great or Little Russians. 2. Poles, comprising the nobles and most of the citizens. 3. Jews, of whom there are above 40,000. Disseminated among those three nations there are some Great Russians, Germans, Moldavians, Tartars, and gypsies. The great majority belong to the Russian-Greek Church, and are under the bishop of Volhynia, who has 1570 churches, including 12 cathedrals, in his diocese; his residence is at Zitomir. The Roman Catholics have a bishop of their own at Luzk, 94 churches, and several convents. The United Greeks have some convents, and the Jews their synagogues. Public education is more general than in many other governments of the Russian empire, but the number of schools and scholars cannot be stated with any degree of accuracy. The principal towns are—Schitomir (in Polish, Zitomierz), the capital of the government, situated on the river Teterow. Before it came under the dominion of Russia it was an insignificant place, with less than 2000 inhabitants. It has now 8500, or, according to some accounts, 11,500, who have a considerable trade in woollen-cloths, linen, silks, calicoes, leather, wax, and honey, and Moldavian and Hungarian wines, with the adjoining provinces. Berdykziew, an ugly ill-built town, is one of the most considerable in the country; it has several churches, and a large fortified Carmelite convent. The population, which we have set down at 9000 [Russia], is stated in a recent Russian official journal to be now between 30,000 and 40,000, of whom a great proportion are Jews; there are several respectable Christian merchants, who carry on a considerable trade in the productions of the country. Iaslau, with 5000 inhabitants, is built like most antient Polish towns, but is not so dull; it has four Greek churches and one Roman Catholic church, a monastery, and a synagogue. The inhabitants have some manufactories, six annual fairs, and a brisk trade in the produce and manufactures of the country. Ostrog, on the Wellija, consists of the old and the new towns; it contains an antient castle, several Greek and Roman Catholic churches, a Basilian convent and school. The inhabitants, of whom many are Jews, carry on a considerable trade: the annual fairs are well attended. Ostrog is celebrated as having very early possessed a Russian press, where the first complete Bible in the Russian language was printed in 1581. Kremenetz (in Polish, *Krzemieniec*) is situated at the foot of a high mountain, on which there is a castle or citadel. It has several Greek churches, a monastery, a school, and 8000 inhabitants. It was besieged and taken by the Mongols in 1240.

(Brockhaus, *Conversations Lexicon;* Schnitzler, *La Russie, la Pologne, et la Finlande;* Hassel, *Das Russische Reich in Europa;* Stein, *Statistisches Lexicon.*)

VOLKAME'RIA, a genus of the natural family of Verbenaceæ, so called in honour of John George Volkamer, a physician of Nürnberg, who published the 'Flora Noribergensis,' in 1700. To this genus a great number of Asiatic plants have been referred by different botanists, but these are now considered to be strictly species of Clerodendron. The genus now contains only a single West Indian species, V. aculcata, which is one of the most common plants in the low lands of Jamaica, in a dry gravelly soil, and is abundant in most of the other islands, growing to the height of 5 or 6 feet, with oblong acute, quite entire leaves, with spines from the rudiments of the petioles. The flowers come out from the side of the stalk, five or six on the same peduncle, almost in form of an umbel, in shape somewhat like those of the common jasmine, but with a curved tube.

VOLKONSKOITE, a mineral containing oxide of chromium. Occurs amorphous. Fracture conchoidal or uneven. Very soft; feels smooth. Colour fine grass green. Dull; assumes a polish when rubbed by the fingers. When heated in a glass tube, loses water, and becomes of a brown colour; by calcination loses about one-third of its weight, and becomes of a dark brown colour.

It was found in Mount Jessmietski, in the government of Perm, Siberia: occurs in thin veins and nests.

Analysis by Berthier:—

Silica	27·2
Green Oxide of Chromium .	34·0
Peroxide of Iron	7·2
Magnesia	7·2
Water	23·2
	98·8

VOLKOV, PHEDOR GRIGORIEVITCH, the founder of the Russian theatre, and son of a merchant of Kostroma, was born February 2nd, 1729. He lost his father while young, and his mother married again, but her second husband, Polushkin, a merchant at Yaroslav, proved a kind stepfather to her children. He was more particularly attached to Phedor, her eldest son, and sent him to the Zaikonaspassky Academy at Moscow to learn mathematics and German, and prepare himself for theological studies: but there Volkov was thrown in the way of pursuits very different and far more congenial with his disposition. It was the practice at that seminary for the scholars to get up dramatic recitations and performances, acting sometimes religious pieces or mysteries, and sometimes comedies taken from Molière. Except that he displayed general cleverness, we are not told what progress he made in his other learning, but in the dramatic art he was no sooner a scholar than he showed himself to be a master, and also made rapid proficiency in painting, music, singing, and other accomplishments of that kind. The idea of his studying theology was now given up, while that of his taking to the stage as a profession did not suggest itself either to him or his friends, because there was then no such profession—no public stage in Russia. He was therefore placed by his stepfather, in 1746, in the counting-house of a merchant at St. Petersburg, with whom he soon became a favourite, and who took him to see the Italian operas at the court theatre. To say that Volkov was delighted would but coldly express the rapturous enthusiasm with which he was seized; nor was it at all abated when he afterwards saw some of Sumarokov's pieces performed or recited by the pupils of the 'Cadet Corps.' One of his first objects was to become acquainted with some of the actors of the Court Theatre, to make himself master of Italian, and to obtain a thorough insight into all the business of the stage, with its machinery and various appurtenances. Not least of all is it to his credit that though he was thus engrossed by his theatrical passion, he did not, distasteful as they were to him, neglect his counting-house duties, or the affairs which his stepfather had entrusted to his management.

Whatever it might have cost him at the time, for this he was amply rewarded by the affectionate reception with which he was greeted by his worthy stepfather Polushkin and his whole family on his return to Yaroslav. Instead of being lectured for his theatrical passion, he was permitted to get up a theatrical performance, after he had sufficiently trained his brothers and some of their acquaintance, and a barn had been converted into a stage with 'real scenes.' All Yaroslav was invited, and all Yaroslav went away in raptures—which were more than mere compliments, for some of the principal inhabitants immediately set on foot a subscription to erect a permanent theatre, of which Volkov was appointed architect, decorator, scene-painter, machinist, manager, director of the orchestra, purveyor of novelties, and dramatic writer. This was the first Russian theatre, the progenitor of those magnificent and colossal edifices of which that country can now boast.

It was not long before the fame of the Yaroslav theatre reached St. Petersburg, and the empress Elizabeth wished to witness a performance by the Yaroslav actors on her own private stage. They accordingly repaired to Petersburg, and played before the empress Sumarokov's drama of 'Sinav and Truvor.' Their success was complete, and the whole company of youthful actors was retained, although several of them were placed in the 'Cadet Corps' in order to perfect their education, and some were sent abroad to study the dramatic art and improve their talents.

In 1756 Volkov was ordered to proceed to Moscow and establish a theatre in that capital; which commission he executed with so much zeal and ability, that within the course of two years the stage was there put upon a very respectable footing both in point of talent and of scenic representation. Standing high in the favour of the empress, he enjoyed that of the court, and afterwards of her successor Catherine II., who would have conferred on him the rank of nobility, had he not declined that distinction for himself, begging that it might be transferred to his married brother Gabriel. But he did not enjoy Catherine's favour very long, for at the time of her coronation at Moscow, on which occasion he was charged with the superintending the arrangements of some part of the public festivities, he caught a cold that was succeeded by inflammatory fever, which carried him off, April 4th, 1763.

Volkov is said to have translated several pieces for the stage, and also to have written some original ones; but as none of them have been preserved, or if in existence have not yet been brought to light, his fame as a dramatist is only traditional. He also made a collection of the biblical dramas of St. Demetrius, metropolitan of Rostov (1651-1709), which he presented to Catherine, who bestowed them on Prince Orlov, who was a great admirer of literary relics and antiquities; but what afterwards became of the manuscripts is not known. (*Entziklopeditcheskii Leksikon.*)

VOLKHOW, River. [RUSSIAN EMPIRE.]

VOLNEY, CONSTANTIN-FRANÇOIS CHASSEBOEUF, COMTE DE, was born 3rd February, 1757, at Craon in Anjou, where his father was a distinguished advocate. He was educated at the colleges of Ancenis and Angers. At this time, and till he reached his twenty-fourth year, he bore the name of Boisgirais, invented by his father, to whom the ancestral Chasseboeuf had always been matter of annoyance. His father's wish was that he should study the law; and with this view he came up to Paris in his seventeenth year, having already a small income of 1100 livres (about 45*l.*) of his own, left him by his mother: but he soon exchanged the study of the law for that of medicine; and eventually, on succeeding to a further independent revenue of 6000 livres (240*l.*), he gave up the thought of following any profession. He now, in 1783, set out for the East. After shutting himself up for eight months in an Egyptian convent to study the Arabic language, he spent above two years more in traversing Lower Egypt and Syria; and on his return to France in 1787 he published, in 2 vols. 8vo., his account of the physical and political condition of these countries, and of their geography and antiquities, under the title of 'Voyage en Syrie et en Egypte pendant les années 1783, 84, et 85.' The first edition of Larcher's translation of and commentary on Herodotus had been published at Paris the year before, and had probably done something to awaken a general interest about the subject of Volney's book. Volney also, with the advantages of personal observation, with very considerable learning, and with more acuteness than Larcher, came to support the same view of the trustworthiness of Herodotus which that writer had enforced. On the whole Volney's was universally received as at once by far the most graphic and spirited, and the most exact and complete description of Egypt and Syria which had yet appeared. A third edition of the work, with considerable additions, appeared in 1800; and there is an English translation of it in 2 vols. 8vo. It was followed the next year by a short tract on the war then carrying on between Turkey and Russia ('Considérations sur la Guerre des

Russes et des Turcs'), remarkable for its anticipation of the seizure of Egypt by the French, attempted ten years later; and also for the indiscretion or unusual frankness with which certain facts and questions of the diplomacy of the day were discussed in it; so that it was christened by the wits 'Inconsidérations sur la Guerre,' &c. This tract was reprinted in the 1800 edition of the 'Voyage;' and again by itself in 1808. Volney, who had some sanguine notions upon new modes of farming, which he wished to have an opportunity of trying on a property he proposed purchasing in Corsica, now got himself appointed by the French government director of the agriculture and commerce of that recently acquired island; but being elected deputy of the tiers état to the National Assembly for the sénéchaussée of Anjou, he remained for the present in France to take part in the great events about to be transacted there; and he soon after resigned his government office. In the Constituent Assembly, and afterwards in the Convention, of which he was also a member, Volney acted generally with the party of the Girondists, assisting the onward movement till the establishment of the reign of terror in 1793; when, like many of his associates, he began to think that matters had been carried too far; but having a weak voice, he was no orator, and his personal influence in the House was inconsiderable. His history accordingly still continues to be principally that of his literary career. It appears that in 1788 he had commenced at Rennes a paper called 'La Sentinelle.' In 1790 he gave in to the Académie des Inscriptions an essay for a proposed prize on the subject of the Chronology of the Twelve Centuries preceding the invasion of Greece by Xerxes. Although he had no competitor, the prize was not awarded to him; but the essay was afterwards published by Naigeon in the 'Encyclopédie Methodique.' In September, 1791, he presented to the National Assembly his famous 'Ruines, ou Méditations sur les Révolutions des Empires;' the work in which he first announced those peculiar views as to the symbolical character of the Christian and other religions (similar, as has been observed, to those developed by Dupuis in his 'Origine des Cultes,' probably known to Volney, though not yet published), to which his name principally owes its popular notoriety. There are numerous French editions of the 'Ruines,' and there is also a wretched English translation of the work, which has been often printed. It contains many striking and ingenious views and some eloquent writing, though extravagant and absurd in its leading principles. Soon after it appeared Volney retired to Corsica to cultivate a property which he had purchased there; but the insurrection headed by Paoli compelled him to leave the island in the spring of 1793. It was during this visit to Corsica that he first became acquainted with Napoleon Bonaparte, then an officer of artillery. On his return to Paris he published, in the 'Moniteur' of the 20th and 31st of March, a 'Précis de l'Etat de la Corse.' In 1793 he published his well-known brochure (generally printed with his 'Ruines'), entitled 'La Loi Naturelle, ou Catéchisme du Citoyen Français,' or otherwise 'Principes Physiques de la Morale,' a title which sufficiently explains its spirit and object. It is a clear and comprehensive exposition of such a system of ethics as can be reared on the theory of materialism. Volney was now sent to prison by Robespierre as a royalist, and remained in confinement for about ten months: he regained his liberty on the overthrow of Robespierre by what is called the revolution of the 9th Thermidor (27th July, 1794). Soon after he was appointed professor of history in the newly established Ecole Normale; and here for about a year he delighted crowded audiences by his brilliant lectures, which were taken down as they were delivered, and have been several times printed. In 1795 he drew up, at the request of the vernment, a series of 'Questions de Statistique à l'Usage des Voyageurs,' which were reprinted in 1813. This year also he published the first of his works on a subject which for the rest of his life engaged much of his attention, a tract entitled 'Simplification des Langues Orientales, ou Méthode nouvelle et facile d'apprendre les Langues Arabe, Persane, et Turke, avec des Caractères Européens.' His notions upon this subject were opposed by Langlés, Silvestre de Sacy, and other Orientalists; but he never himself relinquished them; and he had the satisfaction, a few years after this, of having an important testimony borne at least to the learning and ingenuity he had shown in explaining and applying them, by the Asiatic Society at Calcutta, which in 1798 elected him one of its honorary members.

The Ecole Normale was suppressed in 1795; upon which Volney proceeded to the United States of America. He was well received by Washington, then president; but his residence became less comfortable after the commencement, in 1797, of the presidency of John Adams, whom he is said to have offended by some severe things he had said of his work on the 'Constitution of the United States;' and in the spring of 1798 he quitted America and returned to France. While residing in New England he had been attacked by Priestley in his 'Observations on the Progress of Infidelity;' and he replied in a pungent letter, which he caused to be translated into English and sent to the press. During his absence he had been elected a member of the Institute. Ever since they became acquainted in Corsica, Volney and Bonaparte had been good friends; it is said that it was by Volney's advice that Bonaparte was dissuaded from going, in the beginning of 1794, to offer his services as a military man to Turkey or Russia; and Volney is supposed to have had, soon after his return from America, a share in the contrivance and preparation of the revolution of the 18th Brumaire (9th of November, 1799), which placed Bonaparte at the head of affairs. Bonaparte wished him to be one of his colleagues in the consulate; but he refused both that and the ministry of the interior, and would only consent to be nominated to a seat in the senate. From this date an alienation began to take place between the two; their first open difference was on the subject of the church, the restoration of which as one of the establishments of the state Volney conceived to be a very foolish proceeding; but their notions upon all other matters also ran in opposite directions. When Bonaparte assumed the imperial title, Volney offered the resignation of his senatorial dignity; he was prevailed upon to retain his seat, but he seldom attended after this, and when he did he joined the small minority of the body which Napoleon contemptuously called the 'idéologues,' 'hommes speculatifs,' and other such names. He subsequently however accepted the titles of comte and commandant of the Legion of Honour. In 1803 he published, in 2 vols. 8vo., his 'Tableau du Climat et du Sol des Etats-Unis d'Amérique,' a work which sustained the reputation he had acquired by his 'Travels in Egypt and Syria,' though it is now of no value. His next work was a 'Rapport fait à l'Académie Celtique sur l'Ouvrage Russe de M. le Professeur Pallas, Vocabulaires comparés des Langues de toute la Terre,' which appeared in 1805. In 1808 he recast his 'Essay on the Chronology of the Early Ages,' and republished it under the title of 'Supplément à l'Hérodote de Larcher.' This is a tract of only 80 pages, in which he fixes the date (625 B.C.) of the great solar eclipse stated to have been foretold by Thales [ALYATTES; THALES]; and also that of the capture of Sardis and fall of the Lydian kingdom (557 B.C.). That and another work, entitled 'Chronologie d'Hérodote,' which he published the following year, involved Volney in a controversy with Larcher, whom he had attacked with much asperity, provoked perhaps in part by the complete change of opinion as to religion which Larcher, formerly as decided an infidel as himself, had avowed in the second edition of his 'Herodotus,' published a few years before. Volney however suppressed most of the personalities originally contained in these two works when he reprinted them in 2 vols. 8vo., in 1814, along with an examination of the antiquities of Persia, India, and Babylon, under the title of 'Recherches Nouvelles sur l'Histoire Ancienne.' In 1810 Volney married his cousin, formerly Mademoiselle de Chasseboeuf, between whom and himself there had existed an early attachment, but who had married while her lover was abroad, and was now a widow. Upon this occasion he removed from the small house in the Rue de la Rochefoucauld, in which he had resided since his return from America, to a fashionable mansion, with a large garden, which he bought in the Rue de Vaugirard. Volney was one of the senators who voted in favour of the decree passed 2nd April, 1814, for the deposition of Bonaparte; and on the 4th of June following he was elevated to the peerage by Louis XVIII. It may be conceived from all this that his early political ardour had now considerably abated. But he showed that some of his old opinions were still the same as ever by a pamphlet entitled 'Histoire de Samuel, Inventeur du Sacre des Rois,' which he published in 1819, when preparations were making for the coronation of Louis at Rheims, and in which he treated the character of Samuel and of the Hebrew Scriptures in general with equal freedom. It is said that Louis himself, who in private used to profess a very easy liberalism, both in religion and in politics, read this inquiry with not a little relish. Volney's last publication appeared the same year, a tract which he dedicated to the Asiatic Society, entitled 'L'Alphabet Européen appliqué aux Langues Asiatiques.' He also read to the Academy, in 1819, a 'Discours sur l'Etude Philosophique des Langues;' and the collection of his 'Œuvres Complètes,' published in 8 vols. 1820-1826, contains two letters to M. le Comte Lanjuinais, 'Sur l'Antiquité de l'Alphabet Phénicien,' dated also in that year. The last work he prepared for the press was an octavo volume, entitled 'L'Hebreu simplifié,' which appeared immediately after his death. All his acknowledged writings have now been mentioned except a paper entitled 'Vues Nouvelles sur l'Enseignement des Langues Orientales,' and another entitled 'Etat Physique de la Corse,' both printed in the eighth volume of his collected works. But he was also a considerable contributor anonymously to the 'Moniteur' and the 'Revue Encylopédique.'

Volney died on the 23rd of April, 1820. The above facts are chiefly abstracted from an excellent though somewhat partial memoir of him, in the 'Biographie Universelle,' by M. Durozoir.

VOLOGDA, an extensive government of European Russia, extends from 58° 30′ to 64° 40′ N. lat., and from 38° 20′ to 59° 40′ E. long. It is bounded on the north by Archangel, on the north-east by Tobolsk, on the south-east by Perm and Viatka, on the south by Costroma, on the south-west by Yaroslaw, on the west by Novgorod, and on the north-west by Olonetz, comprising an area of 161,000 square miles.

Face of the Country, Soil, and Climate.—The surface of this government is an immense plain, which extends on the east to the Ural Mountains, and is only traversed by a lateral branch of that chain, which crosses the north-eastern part: it contains vast forests, extensive morasses, and some lakes. The soil is very various: there are clay, loam, marl, much peat, and extensive sandy heaths; but there are large tracts in which the surface is covered with a rich mould, and in most parts the soil is susceptible of cultivation. The most fertile part is the south-west.

Besides the Ural and its north-western offset, which runs along the bank of the Petchora, there is here and there a hill, which is called a mountain. The north-eastern chain, here called Pojaes-Kamennoi, or the Stony Girdle, evidently forms the watershed between the Dwina and the Petschora. It is thickly wooded, about seven miles broad, and continues to rise as it runs to the north.

The principal rivers are:—1, The Dwina, which is formed by the union of the Jug and the Suchona. It receives afterwards the Wytschegda, a considerable river which rises at the foot of a branch of the Ural Mountains, and is joined by the Sysola, the Wym, and the Keltma. 2, The Vaga, which issues from a morass, where it is already above 1200 feet in breadth, and is navigable in the spring by small vessels. It joins the Dwina in the government of Archangel. 3, The Petschora, which rises in the Ural Mountains at the point where the governments of Vologda, Tobolsk, and Perm meet: it is from 14 to 20 feet deep, and is navigable throughout the summer. This province has also a canal, called the North Catherine Canal, begun in 1786 and completed in 1817. It is 12 miles in length. It unites two rivers, both called Keltma, one a tributary of the Wytschegda, and the other of the Kama, a tributary of the Volga, by which the Wytschegda communicates with the Kama, or the Dwina, and the Frozen Ocean with the Caspian.

The most considerable lakes are:—1, The Kubenskoe, which receives the Kubana and twenty other small rivers, and from which one branch of the Suchona issues. The island of Kamennoi is on this lake. 2, The two lakes called Piätisorskoi, are very deep. 3, Lake Sandor, 10 miles long and 3 broad, the waters of which are said to heal wounds and ulcers. 4, Lake Kondas. There are numerous morasses in this government, some of which are 25 to 45 miles in circumference.

The Climate is colder than at St. Petersburg, which is three-quarters of a degree more to the north than the capital, Vologda, but it is very salubrious: it however varies considerably in different parts of the province. Thus the greatest heat is of longer continuance in Vologda than beyond the Dwina; and whereas at Ustiug and Jurensk the mercury is often frozen for three days together, it is not frozen at Vologda for more than a few hours: the winter is much longer in the north-eastern than in the south-western portion. The rivers generally freeze between the 13th and the 24th of November, and thaw between the 19th of April and the 19th of May. In spring there are late frosts and intervals of cold weather; in summer many gloomy, foggy, and rainy days, and often night-frosts. The autumn is frequently serene and bright. In August the leaves fall from the trees, and the birds of passage take their departure.

Agriculture; Industry; Trade.—Agriculture requires the utmost care, and the ground must be well manured. The corn that succeeds the best is rye, which yields five or six-fold; whereas barley and oats yield only threefold. Flax and hemp are extensively cultivated; and likewise some hops, peas, and beans. In the south-western circles the produce is sufficient for the home consumption; but towards the north and north-east it gradually diminishes, and a considerable quantity must be imported. No fruit is grown in the north-east, but cabbages, turnips, and garlic thrive; and in the south-west the gardens produce not only most of the vegetables common in Russia, but also apples and cherries. The immense forests constitute the wealth of the province, and furnish a great part of the inhabitants with occupation and the means of subsistence. The trees attain a great height, and the forests produce berries of various kinds in great abundance. The chace is very profitable, and furnishes many valuable articles both for the inland and foreign trade. The wild animals are elks, reindeer, ermines, martens, weasels, squirrels, hares, gluttons, bears, wolves, lynxes, foxes and wild cats, various kinds of birds and water-fowl, among which are twelve species of ducks. Horses, oxen, sheep, goats, and swine are numerous. The small cattle are of the best kind in the western, the larger in the eastern half of the province. The rich pastures east of the Dwina and the many salt-springs are so favourable to the cattle, and the breed both of horses and oxen is so good, that great numbers of them are sold at high prices at St. Petersburg and Moscow. The inhabitants have no poultry except the common barn-door fowl, and bees are seen only occasionally in the southern circles. Though the province is so well watered, fish are scarce, and considerable quantities of herrings, salmon, and stockfish are imported from Archangel, sturgeons from the Volga, and other fish from Novgorod.

The *Minerals* are iron, copper, granite, freestone, quartz, felspar, whetstones, limestone, and salt. The salt-springs are very important, and supply almost the whole consumption of the province.

Manufactures and Trade.—There are few manufactories in this government, but the number is gradually increasing. There are manufactories of woollen cloth, linen, glass, iron-ware, and paper. There are also brandy distilleries, tanneries, and manufactories of candles, which are highly esteemed all over Russia. The commerce of the province is not unimportant. Vologda may be regarded as the centre of the trade of Siberia with Archangel, being situated on the great road between them, and there is a very active trade, which is carried on in the summer on the rivers, and in the winter on sledges. The principal trading towns are Vologda, Totma, and Ustiug. The several annual fairs are very well attended.

The population of this government, amounting to 830,000 inhabitants, consists of Russians, who are the majority; of Syrianes, who are a remnant of the antient Finnish inhabitants; and of some Samoïedes who lead a wandering life in the inhospitable deserts of the north-east, on the banks of the Petschora. The Syrianes, who have embraced the Greek religion, differ from the Russians only in speaking their own dialect, and by their stupidity, indolence, and uncleanliness. Education is in a backward state; the schools are few, but some progress has been made in the foundation of new schools, and in increasing the number of teachers and scholars.

VOLOGDA, the seat of government, and the see of the bishop, is situated in 59° 12′ N. lat. and 40° 10′

E. long., on both sides of the river Vologda. It is an open town, consisting of two principal parts, each of which is divided into four quarters. The public buildings and institutions are—51 churches, six of which are of stone; 1 monks' convent; 1 nunnery; 1 theological seminary for 600 priests' sons; a gymnasium; a district school; several charitable institutions; and many buildings and magazines belonging to the crown. The inhabitants, 14,000 in number, manufacture linen, silks, leather, sealing-wax, white-lead, colours, vitriol, and have very extensive tanneries and candle manufactories; they likewise make very superior articles in gold, silver, enamel, and lacquered ware. Their commercial connections are very extensive. The merchants trade with St. Petersburg and Archangel, to which they send hemp, tallow, Russia leather, linen, candles, linseed, bristles, salted and frozen fish; they receive in return colonial and other foreign merchandise, with which they carry on a profitable retail trade. They likewise trade direct with China and the Aleutian Islands, to which they send Russian productions and manufactures, and receive in return furs and all sorts of Chinese articles. They are also connected with British and Hanseatic merchants. The city is surrounded with gardens, which produce good vegetables and some fruit.

Totma, on the Suchona, consists of three broad streets, has 17 churches, 3 convents, several magazines, and 3000 inhabitants, among whom are many artisans and intelligent merchants, who have not only a very profitable retail trade, but also a considerable commerce with Archangel and Siberia. The salt-works produce annually from 30,000 to 40,000 poods of salt.

Ustiug-Velliki has been described in a separate article. [USTIUG-VELLIKI.]

(Hassel, *Das Russische Reich in Europa*; Schnitzler, *La Russie, la Pologne, et la Finlande*; Stein, *Geog. Lexicon*; Stein's *Handbuch*, edited by Hörschelmann.)

VOLOGE'SES. [PARTHIA.]

VOLPA'TO, GIOVA'NNI, a distinguished Italian engraver, born at Bassano in 1738. He was first employed in tapestry embroidery, an art which he learnt from his mother; but he at the same time occasionally occupied himself with engraving, which he acquired without instruction, and he published some prints under the assumed name of Renard. The success of these prints was sufficient to induce him to adopt engraving as a profession, and he accordingly fixed himself in Venice, where he became the pupil of the celebrated Bartolozzi. Volpato engraved many good prints after several Venetian masters, but his best works were engraved after Raphael and other masters at Rome, where he finally settled. He was employed as its principal engraver by a society of dilettanti which undertook to re-engrave all the works of Raphael in the Vatican. Volpato engraved on a large scale seven of the great works of Raphael in the so-called stanze; an eighth, 'The Mess of Bolsena,' was engraved by his pupil and son-in-law Raphael Morghen. The prints were published coloured as well as plain, and are a very valuable set of engravings. He published in the same style the Farnese gallery by Annibal Carracci; and many other celebrated works of the great Italian masters. He published also many coloured landscape etchings of Roman views, &c., in partnership with P. du Cros. Another of his great works is a set of fourteen views of the galleries of the Museo Clementino, with all its works of art. He engraved also two prophets and two sibyls from those of Michael Angelo in the Sistine Chapel. His prints are remarkably numerous considering their scale and the style in which they are executed. Huber, who wrote before the death of Volpato, enumerates, as his principal works, 166 engravings. He and his son-in-law Morghen were the best engravers in Italy at the end of the eighteenth century. Volpato died at Rome in 1803.

(Huber, *Manuel des Amateurs*, &c.; Heller, *Praktisches Handbuch für Kupferstichsammler.*)

VOLTA, ALESSANDRO, was born at Como, in 1745, of a noble family, and was educated in that city; in 1774 he was appointed professor of natural philosophy in the University of Pavia; and while he held that chair he made the discoveries which have immortalized his name.

It appears that in his youth he had a taste for letters; and among his effusions is a poem, in Italian, on Saussure's ournev to Mont Blanc: he also composed one in Latin, which treats of the principal phenomena of chemistry. This taste did not however continue, and the bent of his mind was afterwards decidedly in favour of the sciences connected with electricity.

In 1777 Volta made an excursion into Switzerland, and three years afterwards he travelled through Tuscany. During the latter journey he observed and drew up a description of the flame which appears to issue from the ground about 40 miles from Florence, on the road to Bologna. In 1782 he travelled through Germany and Holland, and made a visit to England, where he became known to Sir Joseph Banks and the most distinguished philosophers of the country: he returned through France, and he is said to have then introduced into Lombardy the culture of the potato, which he had observed in Savoy.

When Bonaparte first entered Italy, in 1796, Volta was one of the persons appointed by his fellow-citizens to solicit the protection of that general, who afterwards took every opportunity of conferring honours upon him. He caused him to be named a deputy from the University of Pavia to a congress which was held at Lyon for the purpose of electing a president of the Italian republic; and in 1801 he invited him to Paris in order that he might repeat before the members of the Institute his experiments with the *pile* which he had invented. On this occasion that learned body presented Volta with a gold medal and elected him one of its foreign associates. Bonaparte also made him a member of the Legion of Honour, and conferred on him the order of the Iron Crown, with the titles of count and senator of the kingdom of Italy. He had been elected a Fellow of the Royal Society of London in 1791.

In 1804 Volta was allowed to resign his professorship; and, giving up his studies, he spent the rest of his life at his native town, Como. Here he was seized with a fever, which, after an illness of only two days, terminated fatally on the 5th of March, 1826.

He married in 1794, and by his wife he had three children, whose education he himself superintended. His life was one of uniform piety, and he died sincerely lamented by every friend of science; particularly by his fellow-citizens, who struck a medal and erected a monument to his memory.

In proof of the inclination of Volta in favour of the physical sciences it may be observed, that when he was only eighteen years of age he corresponded with the Abbé Nollet on the subject of electrical phenomena, and that six years afterwards (1769) he addressed to Beccaria a dissertation in Latin, entitled 'De Vi Attractivâ ignis Electrici.'

In 1775, while pursuing some experiments on the non-conducting property of wood when impregnated with oil, he was led to the construction of his 'electrophorus,' an instrument consisting of two circular plates of metal having between them one of resin: the upper plate was furnished with an isolating handle of glass, by which it was to be raised from the plate of resin; and the latter being excited by friction, the whole constituted a kind of electrical machine. An account of it was given in Rosier's 'Journal de Physique' for 1776; and Dr. Ingenhouz afterwards explained its principles on the Franklin theory of positive and negative electricity. (*Phil. Trans.* 1778.)

The efforts of Volta to improve the electrophorus led him in 1782 to the discovery of the instrument which he designated an electrical condenser. This is, rather, a variation of the former instrument, a plate of marble or varnished wood being substituted for the resin between the conductors. A wire being brought to the upper conductor from the object in which a faint degree of electricity exists, after a time the conductor, on being lifted up by the glass handle, is found to have received from the object a considerable quantity of electricity. An account of this instrument was given by Volta himself, in the 'Philosophical Transactions' for the same year (vol. 72); and it is there stated that he had succeeded in ascertaining by it the existence of negative electricity in the vapour of water, in the smoke of burning coals, and in the gas produced by a solution of iron in weak sulphuric acid. With this instrument Volta employed an electrometer consisting of two pieces of straw suspended in a glass jar, from the stopper; these diverged from each other on bringing an electrified body in contact with a ball of metal connected with the stopper; and by means of a graduated scale, the intensity of the electricity was measured.

In 1777 Volta invented the elegant apparatus which is called the hydrogen lamp; it is constituted by a stream of hydrogen gas which is made to issue through a small aperture by means of the pressure of a column of water, and the gas is fired by the spark from an electrophorus placed below it. About the same time he discovered a process for determining the proportions between the two gases, oxygen and azote, which constitute common atmospherical air; this is accomplished by introducing a given quantity of hydrogen gas into a glass tube with a certain quantity of atmospherical air, and firing it by the electrical spark: the quantity of oxygen was indicated by the diminution of the volume. He also invented the instrument which has been called the electrical pistol.

But the discovery by which the name of Volta is chiefly distinguished is that of the development of electricity in metallic bodies. A series of experiments judiciously devised and skilfully conducted led him to the knowledge of this principle, the applications of which have since produced such important consequences.

Galvani had given the name of animal electricity to the power which caused spontaneous convulsions in the limbs of frogs when the divided nerves were connected by a metallic wire [GALVANI]; but Volta observing that the effects were far greater when the connecting medium consisted of two different kinds of metal, inferred from thence that the principle of excitation existed in the metals, and not in the nerves of the animal; and he assumed that, by their contact, there was developed a small quantity of the electrical fluid, which, being transmitted through the organs of the frog, produced the convulsive movements. These discoveries Volta communicated to the Royal Society of London in two letters addressed to Mr. Cavallo, which were published in the 'Philosophical Transactions' for 1793; and in the following year he had the honour of receiving the Copley medal, in gold, which was awarded to him by the Society. In the first letter it is stated that when different metals are placed near each other, with a saline liquid between them, there is produced a disturbance of electrical equilibrium, one metal giving a portion of its natural electricity to the other, so that the latter becomes positively, and the former negatively electrical; the use of the liquid being to transfer the electricity from one metal to the other. But in the second letter Volta states that he considers all conductors of electricity to be divided into two classes, one dry and the other moist; and he assumes that electricity is excited when two conductors of either of these classes are in contact with one of the other class: an idea apparently at variance with that of the supposed actions of unlike metals on one another.

Repeated experiments, followed up during seven years, led Volta at length to the invention of what is designated an electrical battery: it consisted of a series of cups disposed in the circumference of a circle; each cup contained a saline liquid, in which were placed, on their edges, a plate of zinc and one of silver; and the upper edge of the silver plate in each cup was connected by a wire with that of the zinc plate in the next. This apparatus, which was called a 'corona,' was superseded by one formed on the same principle with respect to the alternations of metal plates, which is called the galvanic or Voltaic pile. [GALVANISM.] Volta's account of his researches concerning the development of electricity by the pile was sent to the Royal Society in the year 1800: but, in consequence of the war between Great Britain and France, one portion of the account could not be sent till some months after the first had been received; and, in the interval, the pile was constructed, and many experiments were made with it in this country. The paper appeared however in the 'Philosophical Transactions' for that year (vol. 90), in the form of two letters addressed to Sir Joseph Banks.

It is remarkable that Volta, during the remainder of his life, confined his experiments with the pile to such as concern its action on the animal body, and he does not appear to have made any use of it as an instrument of chemical analysis; even the decomposition of water by it was first effected by Messrs. Nicholson and Carlisle. He always maintained the opinion that an electrical process took place in the pile, and that a chemical action was merely incidental; while the English experimentalists in general considered the latter as essential to the production of the effects, and to arise from the oxidation of the metals by the saline liquid: they found that the pile does not act when pure water is interposed between the plates, and that its action ceases when the apparatus does not continue to receive a supply of oxygen. The latest researches have shown that the effects of the pile are partly electrical and electro-magnetical, and partly chemical: to the former class are referred muscular contractions and the deviations of magnetized needles; and to the latter the decompositions of material substances. It may be observed here, that Volta supposed the heart and the other involuntary muscles to be incapable of being excited by galvanic action—an opinion which has been found to be erroneous.

By the faculty of skilfully combining experiments, and a profound sagacity in perceiving the consequences which might be deduced from them, Volta was enabled to make many important discoveries; but it is remarkable that he often held unfounded opinions of the causes of the phenomena, and he does not appear to have pursued any of his researches so far as to arrive at mathematical precision in his results. Thus he erroneously ascribed the properties of his electrophorus and condenser to the effects of an electrical atmosphere which he supposed to exist about the surfaces of bodies; and he deceived himself in considering his electrometer to be capable of measuring with accuracy the intensity of electricity in bodies; when, for this purpose, it was in reality far inferior to the torsion balance of Coulomb. By a series of experiments he succeeded in discovering the influence of conductors on the preservation and transmission of electricity; but it was reserved for the last-mentioned philosopher to determine by experiment and by mathematical analysis the exact laws of the dissipation of electricity from bodies in contact with air, its density in spheres of different magnitudes and also at different parts of an imperfectly insulating body, and the influence of points in facilitating its transmission. An inattention to accuracy of investigation is considered as the cause that Volta lost the opportunity of discovering the true cause of the development of electricity in the evaporation of water, which is the most important circumstance in the electrical phenomena of the atmosphere.

A collection of the works of Volta, dedicated to Ferdinand III., grand-duke of Tuscany, was published, in 1816, at Florence, under the title, 'Collezione delle Opere,' &c., in 5 vols. 8vo.

VOLTAGRAPHY. An important application of a physical principle having been made since this Cyclopædia was too far advanced to admit of its being described under a more appropriate title, the present is from necessity coined for the purpose.

Under the article VOLTAISM will be found an account of the principle of what are termed *batteries*, or arrangements for generating and sustaining electro-chemical currents. If the wire connected with the zinc element of a compound battery have a plate or surface of any conducting substance attached to it, moulded into any form or having any design or pattern cut upon it, while the other wire terminate in a copper plate of equal surface with the former, both being placed near and parallel to each other, but not in contact, and be immersed in a saturated solution of sulphate of copper, this solution will undergo decomposition, and the metallic copper will be slowly and equally deposited on the plate, and will form an exact counterpart or *cast* of the form or pattern. It is the power thus obtained of copying in metals deposited by electrolytic action any form or pattern which is made the negative surface of a voltaic circuit which constitutes what we have termed voltagraphy: and it now remains to explain briefly by an example the mode of manipulation to be employed.

Let the object to be copied be a small *bas-relief* of about six inches by four, executed in a material such as marble, ivory, or plaster of Paris, which will admit of a wax mould being taken from it by the usual processes: to do this, the original, if of the last-named material, must be well oiled at its surface, to prevent the wax adhering to it; but the oil must be allowed time thoroughly to soak into the plaster. The wax, which should be of the finest white kind, must be poured on, well melted, and the plaster should be previously warmed to prevent the wax being suddenly cooled by the contact before the whole surface is covered with it: when perfectly cold, the mould may be detached from the original without injury to either. That this mould may be employed as the conducting-plate of a voltaic circuit, its surface must be rendered *conducting*, which the wax itself is not: for this purpose the surface is covered over with the finest powdered plumbago*, equally and lightly rubbed in by means of a camel-hair pencil; and it must be distinctly understood that the success of the operation entirely depends on the surface of this mould being perfectly and equally covered in every part of its face only with the plumbago, the back and edges remaining as they were.

A vessel of any convenient form, capable of holding the mould and a copper plate of the same size at half an inch from it, so that they may be quite immersed in the solution of sulphate of copper, must be prepared: it is better if the mould and plate be vertical in the vessel; and further, this must not be made of any metal: earthenware, or wood lined with cement to make it water-tight, are preferable. The copper plate must have a wire soldered to its upper edge, for the purpose of connecting it with that of the battery, both plates of which should consequently be provided with what are termed *binding-screws*,† to allow of these connections being made and broken at pleasure. The wax mould must also be connected with the zinc element of the battery by an intermediate wire, and care must be taken that this wire be in perfect contact at the point of union with the conducting surface on the wax mould; while it obviously must not be so connected as to injure that surface or disfigure it: the plumbago accordingly must be accumulated round the part where the wire is put into the edge of the mould, and continued to the front in a narrow well-defined band.

The mould and the plate being placed parallel and very near to each other, face to face, but not in contact, they must be retained in that position in any convenient manner; but care must again be taken in so doing that there is no contact by any conductor made between them. The vessel may then be filled with the saturated solution of the sulphate of copper and the wires connected with the battery, the precise size and form of which are immaterial. The whole must now be left undisturbed from twenty-four to thirty-six hours, at the end of which time, the mould, being detached from the battery and withdrawn, will be found covered over with pure bright metallic copper, rough on the outer surface; but when separated from the wax by gently heating, it will, if the operation has been successful, present a perfect copy of the bas-relief, every line of which, to the most delicate markings, will be found transferred to the metal with more precision and delicacy than could have been produced by a cast made with the copper in a state of fusion. Perhaps few facts connected with the laws of aggregation of homogeneous matter are more striking than the one under consideration, and few facts indirectly afford a more remarkable instance of the chemical divisibility of matter. The infinite gradations of tint produced on a silvered surface coated with vapour of iodine, and acted on by light, in the process called the Daguerreotype, can be copied with the most perfect accuracy by voltagraphy; and it must be remembered that these gradations solely depend on variations in the molecular arrangement of a coating of mercury, with which the silver has been amalgamated, by exposing it to the vapour of that metal, too thin to be measured, and defying microscopic power to detect.

In order to admit of the copper during its deposition arranging itself so as to assume a malleable or true metallic texture, it is necessary that the electrolytic action be not too rapid; accordingly the battery should be weak in its action: in short, every part of the process requires the most scrupulous care and nicety to ensure perfect success, which can only be acquired by practice. Among other precautions which should be mentioned is that of not reversing the connections, if at any time during the process they should be broken, to allow of the progress of the work being ascertained; for if this should be done, the current being reversed, the copper previously deposited on the mould will be re-absorbed. And in order to keep up the equable and constant deposit which is necessary to ensure homogeneity in the metallic deposit, the liquid solution, both in the vessel containing the mould and in the battery, must be kept constantly saturated by the addition of fresh solid crystals of sulphate of copper: but in putting these into the former vessel, care must be taken not to let the crystals touch the mould; and indeed the fluid in this vessel should not be disturbed if possible during the process, which is easily insured by placing a sufficient quantity of the salt in the vessel before the commencement of the operation.

The modifications in the mode of manipulation, rendered necessary by the nature of the object to be copied, are too numerous to be even alluded to, as well as the essential variations when another metal, as silver or gold, is to be deposited; but it must be here observed that it is only those metals which are perfectly malleable that can be employed in the process, such as silver, gold, and copper, and the last far surpasses the others in adaptation to this purpose.

In conclusion it must be mentioned that if the process of voltagraphy were only capable of affording amusement in copying medals, casts, seals, and similar objects, although well deserving notice, it would not have found a place in this work; but already there are factories established in Birmingham and elsewhere where the process is employed, economically, as we are informed (1843), in plating articles of considerable size, and as yet the practical application of the art is in its infancy. The process has been also most successfully employed to produce copies of valuable and expensive copper-plates, from which copies impressions may be taken as from the original plate, and not distinguishable from them; and thus the luxury of fine works of art is brought within the attainment of large numbers formerly debarred from it by the cost of elaborate engravings.

A most curious instance of the extensive applicability of the art of voltagraphy is the fact of calico having been printed by means of it. The linen, steeped in proper liquids, is made to pass between rollers, one of which has patterns formed in it of different metals inserted into its substance, and connected with the zinc of a battery: the other roller is a simple metallic conductor: the current between these surfaces produces different colours by the difference in their action on the common fluid, and thus the pattern is imparted to the calico. If as yet this process is rude, we think there are the elements in it of a valuable improvement of an important branch of manufactures.

VOLTAIRE, FRANÇOIS-MARIE AROUET DE, was born at Châtenay, near Sceaux, on the 20th of February, 1694. His baptism was deferred to the 22nd of November in the same year, on account of his feeble health. His father François Arouet was Trésorier de la Chambre des Comptes, and his mother Marguerite Daumart belonged to a noble family of Poitou. Voltaire was the younger of two sons. He was educated at the college of Louis le Grand, then under the direction of the Jesuits. His character must have already developed itself, if the story is true that Father Lejay, one of his instructors, predicted that he would be the Coryphæus of deism in France. On leaving college he was introduced by his godfather, the Abbé Châteauneuf, to Ninon de l'Enclos, who was much pleased with his lively manners, and bequeathed him a legacy of two thousand francs for the purchase of books. The abbé also introduced him to that brilliant society in Paris, consisting of the Duc de Sully, the prince of Conti, the grand-prior of Vendôme, the abbé de Chaulieu and others, whose conversation confirmed the youth in those loose principles which he had already imbibed. But he was not entirely engrossed by the pleasures of Paris; he had already sketched his tragedy of 'Œdipe,' and in 1712 he was an unsuccessful candidate for a poetical prize which was awarded by the French Academy. In order to detach him from the society of Paris, his father sent Voltaire, in 1713, with the marquis de Châteauneuf, who was ambassador in Holland. Here he fell in love with a daughter of Madame Dunoyer, an intriguing woman, who had left France for Holland to escape from her husband, and had embraced the Protestant religion. It is not clearly stated why the mother disapproved of the mutual affection of her daughter and Voltaire, but she complained to the ambassador, and printed the correspondence of the two lovers. Voltaire was sent back to France, and with difficulty reconciled to his father, who complained of the libertinism of his younger son as much as of the Jansenist opinions of the elder.

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* Pure carbon is the best conductor, next to the metals, and indeed superior to some of them.

† These simply consist of a piece of brass perforated in two directions: through one hole the wire is passed, while the other is tapped to receive a thumb-screw, the end of which, pressing on the wire, establishes an intimate connection between the surface of the wire and the plate of the battery, to which the brass piece must be soldered.

Voltaire was now placed with a procureur, but the practice of the law was intolerable to a man of his tastes and temperament, and he soon left it. A friend of the family, M. de Caumartin, obtained his father's consent to take Voltaire with him to Saint-Ange. Here he met with the father of M. de Caumartin, who had been familiar with the court of Henri IV. and the distinguished persons of that king's reign. Voltaire was delighted with his anecdotes and conversation, out of which grew the idea of the 'Henriade.' He returned to Paris with his project of an epic poem, and his next step was into the Bastille. Louis XIV. had just died, and his memory was attacked by numerous satirical verses. Voltaire, who was then twenty-two years of age, was well enough known to be suspected as the author of some of these verses, and without further evidence he was imprisoned. In his confinement he sketched his poem of the 'Henriade,' under the title of 'La Ligue,' and completed his tragedy of 'Œdipe.' He was soon released by the Regent Duke of Orleans, who was satisfied of his innocence. It is said that about this time he took the name of Voltaire. The tragedy of 'Œdipe' was played in 1718, and was successful, but the author was first compelled by the judgment of the actors to insert a frigid love episode in the 'Œdipe,' in compliance with the taste of the times. In this, his earliest work that is worthy of his reputation, Voltaire commenced that war against the priesthood which he maintained with unabating perseverance to his dying day. The two following verses have been quoted as the manifestation of that hostility to the ministers of religion which became his ruling passion:—

> 'Nos prêtres ne sont pas ce qu'un vain peuple pense;
> Notre crédulité fait toute leur science.'

In 1721 Voltaire accompanied Madame de Rupelmonde to Holland, and on the way visited Jean Baptiste Rousseau, who was then at Brussels. Voltaire took the opinion of Rousseau on his poem of the 'Ligue,' and read to him the 'Epître à Uranie.' Rousseau repaid the compliment by reciting his 'Ode to Posterity,' which Voltaire told him would never reach its address. This story may not be true, but it is at least characteristic of Voltaire. They parted bitter enemies; and from that time Voltaire was the object of Rousseau's implacable hatred.

In 1724 the play of 'Mariamne' appeared, and shortly after the 'Henriade,' under the title of 'La Ligue,' but without the author's consent. The poem had been read by Voltaire to his friends, in order to have the benefit of their criticism, and an imperfect copy of it had been surreptitiously obtained by the Abbé Desfontaines, and printed with some additional verses. The author however could not obtain permission to print it himself, for there were various passages which gave offence to the priesthood. This is the statement in the 'Biographie Universelle,' but it is said in Marmontel's preface to the 'Henriade,' that the first edition of it was printed at London in 1723, and that as Voltaire could not see it through the press, it is full of blunders and transpositions, and also contains considerable blanks (lacunes). It is not suggested that this edition was surreptitious, though it may have been.

A personal adventure, the particulars of which are unimportant in a general sketch like this, led to a quarrel with his friend the Duc de Sully, and shortly after to a second visit to the Bastille, where Voltaire was confined some months. On being released, he was ordered to leave the country, and he came to England, where he found a state of opinion more congenial to his own than in France. The writings of Woolston, Tindal, Collins, and others of the same class, were then in vogue; freethinking opinions were generally diffused; and besides this, the discoveries of Newton and the philosophy of Locke had given an impulse to men's minds in England, which placed this country at that time in a higher position with respect to the rest of Europe than she has ever occupied since. Voltaire had suffered injustice in France from the arbitrary exercise of power; and he had a foretaste of what he might expect from the intolerance of the church. In England he saw a country in which personal liberty was secure, and in which the priesthood had lost the power of persecution. His residence in England, and the society which he saw, exercised a strong influence on him, but it was the religious rather than the political freedom of England which he admired. His notion of liberty was the liberty of writing against priests and religion. In England he wrote his tragedy of 'Brutus,' and in 1726, according to Marmontel's preface, appeared the first edition of the 'Henriade,' which the author himself superintended. It was printed at London, with a dedication in English, by the author, to Queen Caroline, the wife of George II. The edition bears the date 1728, and not 1726, which is a manifest mistake of Marmontel. The work was published by subscription, and produced the author a considerable sum of money. In England also he sketched the 'Lettres Philosophiques,' called also the 'Lettres sur les Anglais,' which appeared some time after. His residence in England was about three years.

Voltaire returned to Paris, and for some time lived a quiet life, dividing his time between literary labour and commercial speculations, which turned out profitable. He also gained some money in a lottery. In 1730 the celebrated actress Adrienne Lecouvreur died, and the usual rites of sepulture were refused to her because she was an actress. Voltaire wrote some verses on the mode in which she was buried, full of indignant invective, and immediately withdrew to Rouen, pretending that he was going to England, in order to avoid a third visit to the Bastille, which he apprehended. At Rouen he printed his 'History of Charles XII. of Sweden,' for which he had collected materials during his residence in England; and also his 'Lettres Philosophiques.' The publication of the Lettres raised a fresh storm, the violence of which seems to have been quite disproportionate to the occasion: they are not the works of Voltaire which even his enemies could most complain of. Voltaire got out of the way in order to avoid a fresh exile, which was denounced against him. His friends however convinced those in authority that the publication of the Lettres was owing to the treachery of a binder, and Voltaire obtained permission to return to Paris. But the 'Epître à Uranie,' which had been long in MS., was now printed, and the author was threatened with a fresh prosecution, which he avoided by disingenuously disavowing it, and attributing the work to the Abbé de Chaulieu, who had been dead for some time. To escape all further trouble, Voltaire determined to retire for a time from Paris. His own successful speculations, and what he had inherited from his father and his brother, had given him a handsome fortune. He had also formed a connection with Madame du Chastelet, the wife of the Marquis du Chastelet, a woman, though fond of pleasure, possessing acquirements which are very unusual in her own sex, and not common in the other. [CHASTELET.] Her studies were geometry and metaphysics, but she could relish poetry and polite literature. She retired with Voltaire to Cirey, on the borders of Champagne and Lorraine, where they led a life of study and retirement, interrupted and varied by an occasional quarrel. At Cirey Voltaire wrote several of his plays, 'Alzire,' 'Mahomet,' 'Mérope,' and others; and he collected materials for the 'Essai sur les Mœurs et l'Esprit des Nations,' which, with all its defects, is one of his best works. Here also he finished his 'Pucelle,' which he had commenced some time before. Several fragments of it had been circulated before he left Paris.

It was in the year 1736, during his residence at Cirey, that a correspondence commenced between Prince Frederick, the son of Frederick William, king of Prussia, and Voltaire; it began by Frederick writing to him to express his admiration, and to solicit the favour of Voltaire's literary counsel. Voltaire's residence at Cirey was not uninterrupted. He visited Paris, and also on several occasions left France, but his movements are not easily traced. Voltaire was at Brussels with Madame du Chastelet, in 1740, when Frederick William died, and he soon received an invitation from his successor Frederick to visit him. The first meeting of the new king of Prussia and Voltaire took place at a small château near Cleves, and is described by Voltaire in his amusing Mémoires. When Frederick was prince-royal, he had written a treatise entitled 'Anti-Machiavel,' which he sent to Voltaire, who was then at Brussels, to correct and get it printed. Voltaire had given it to a Dutch bookseller, but on the accession of Frederick, seeing what his political schemes were, and anticipating, as he says, the invasion of Silesia, he suggested to his majesty that this was not precisely the time for the 'Anti-Machiavel' to appear, and he obtained the king's permission to stop the publication, for which purpose he visited

Holland. But the bookseller's demands were high; and the king, who did not like parting with his money, and was at least not sorry to see his work printed, preferred having it published for nothing to paying anything in order to stop the publication. This is Voltaire's account of the transaction. While Voltaire was in Holland the emperor Charles VI. died, and Frederick began to make preparations for his campaigns. Voltaire visited him at Berlin, but on Frederick's setting out for Silesia, he returned to Brussels. From Brussels he went to Lille, where his tragedy of 'Mahomet' was acted (1741), but though he had at first obtained the permission of the Cardinal de Fleury to have it acted at Paris, the representation was prevented by the intrigues of some zealots, who saw or affected to see in it an irreligious tendency. 'Mahomet' was not acted at Paris till 1751.

On the death of Cardinal de Fleury, in 1743, Voltaire aspired to fill his place in the Académie Française. The King Louis XV., his mistress the duchess of Châteauroux, and the public were in his favour; but Maurepas, the secretary of state, was opposed to him, and successfully intrigued with Boyer, afterwards bishop of Mirepoix, to exclude Voltaire from the Académie. Boyer represented to the king that it would be a scandal for such a profane man as Voltaire to succeed a cardinal; and the king yielded to his representations.

At this crisis France was threatened both by Austria and England, and it was thought prudent to secure the alliance of the king of Prussia. The Duc de Richelieu and the favourite mistress conceived the design of sending Voltaire to him, and, the better to conceal the object of the mission, Voltaire made his quarrel with Boyer a pretext for leaving France. The king approved of the scheme, and Voltaire, who was well furnished with money for his journey, set out for Berlin by way of Holland. He was well received by Frederick, who was then living at Potsdam, the kind of life which he continued ever after his accession to the throne, and which Voltaire has depicted so inimitably in his Mémoires. His mission was to sound Frederick as to his views, and he succeeded in drawing from him a favourable declaration. Voltaire returned to Paris, having executed his commission better than most diplomatists, as the event showed: in the following spring Frederick made a new treaty with Louis and advanced into Bohemia with one hundred thousand men, while the Austrians were engaged in Alsace. But Voltaire was left without his reward. The mistress was vexed that all Voltaire's letters from Berlin had passed through the hands of Madame du Chastelet, instead of her own: she revenged herself by causing the dismissal of M. Amelot, the minister for foreign affairs, from whom Voltaire had received his instructions, and Voltaire's hopes were thus disappointed.

The mistress herself was soon dismissed; and on her death, which followed shortly after, it was necessary for Louis to have a new favourite, and Mademoiselle Poisson, subsequently known as Madame de Pompadour, filled the vacant place. Voltaire was already acquainted with her, and, as he says, was in her confidence. Through her interest he was made one of the forty members of the Académie, in the place of Bouhier (1746): and he was also appointed historiographer of France, and received the place of gentilhomme ordinaire de la chambre du roi. 'I concluded,' says Voltaire, 'that to make the smallest fortune, it was better to say four words to the mistress of a king than to write a hundred volumes.'

During their residence at Cirey, Voltaire and Madame du Chastelet occasionally visited king Stanislaus at his little court of Luneville, which Voltaire has sketched in his usual happy way. Madame du Chastelet died in the palace of Stanislaus (August, 1749), a few days after having been brought to bed. Voltaire returned to Paris, and resumed his literary labours. King Frederick, who had not been able to induce him to visit Prussia during the lifetime of Madame du Chastelet, now renewed his invitation, and after some hesitation Voltaire went to him in 1750. He had apartments assigned to him at Potsdam, a pension of 20,000 francs, a chamberlain's gold key, and a cross of merit. His duties were to correct his majesty's writings, which was rather an irksome occupation. The professions of Frederick were not sincere; and Voltaire could not always prevent expressions escaping him which were reported to the king, and were far from complimentary. To correct Frederick's French verses without laughing at them was impossible. The history of his residence in Prussia is briefly sketched in Voltaire's 'Mémoires.' Voltaire at last got away, 'with a promise,' as he says, 'to return, and the firm resolution never to see him again:' his residence in Prussia was three years. On his return, an odd adventure befel him at Frankfort. He was arrested by a person named Freytag, the resident of the king of Prussia at Frankfort, who demanded of him, in his barbarous French, 'l'oeuvre de poëshie' of the king his master. A few copies of this precious volume of Frederick's poetry had been printed privately and distributed by the king among his favourites: Voltaire had been honoured with one. The poetry had been left behind at Leipzig, and Voltaire was obliged to wait at Frankfort till it came, when it was delivered up to the resident. Frederick probably feared that Voltaire would make some use of the book of poetry to his prejudice, as it contained many satirical reflections on crowned heads and other persons. Even after the surrender of the book, Voltaire and his niece Madame Denis, who had joined him at Frankfort, were detained by Freytag on some miserable pretexts, and kept prisoner in an hotel for twelve days. He was robbed of part of his property, and compelled to pay the expenses of his detention. At last orders came from Berlin, and Voltaire and his niece were allowed to continue their journey to Mayence. It was not long after this adventure of Frankfort, while the memory of the treatment which he had received from the king of Prussia was fresh, that Voltaire wrote those 'Mémoires' which are disgraceful to himself, and affix infamy on the name of Frederick. It is said that he kept the manuscript by him, but that two copies were made without his knowledge, a statement which is not very credible. Upon his subsequent reconciliation with the king, it is said that he burnt the manuscript; but one of the two copies, thus surreptitiously obtained, was printed among his posthumous works.

After a short time Voltaire fixed himself at Colmar for a few months (1754), while Madame Denis was at Paris for the purpose of ascertaining if he could safely return there. A new trouble now befel him. A Dutch bookseller, who had obtained in some way, but it is not said how, an unfinished MS. of the 'Essai sur les Mœurs et l'Esprit des Nations,' published it under the title of 'Abrégé d'Histoire Universelle, par M. de Voltaire.' Some parts which had been purposely suppressed by the Dutch publisher made the work appear an attack on crowned heads and priests. Voltaire got the genuine MS. from Paris, and showed by a comparison of the two MSS., formally drawn up by a notary, that the passages had been suppressed with a malignant design to injure him. This story is in many respects very improbable: Voltaire had never had any scruples about publishing his works under assumed names, or denying the authorship of anything when it suited his purpose; and it is not easy to conjecture how his manuscript should get abroad without his consent, or that the real manuscript should have been left at Paris and that he should be able to recover it. The difficulty is hardly diminished if we assume that Voltaire had possessed two copies of the MS. In fact, the mode in which this MS. fell, as it is said, into the hands of the Dutch publisher is left unexplained.

At length wearied with his rambling, unsettled life, after spending a few years in the territory of Lausanne and in that of Geneva, he bought an estate at Tourney and another at Ferney, both in the Pays de Gex, and he finally settled at Ferney, where he spent the last twenty years of his life in as much tranquillity as his character would allow. He rebuilt the house, laid out gardens, kept a good table, and had crowds of visitors from all parts of Europe. His passion for the stage was unabated. He had a small theatre, in which he sometimes acted himself, and occasionally procured the services of the first actors of the day. He was also a benefactor to the neighbourhood. A little town grew up around him out of a miserable village; new houses were built at his own cost; and he encouraged and produced a body of skilful artisans who became celebrated through all Europe. He even rebuilt the church at his own expense. But his hasty proceedings in this matter brought him into difficulties. He had neglected certain necessary forms in his demolition of the old church, and had ordered a large wooden crucifix, which stood in front of the porch, to be thrown down. He even went so far as to preach a sermon in the church against theft. Complaint was made to the bishop of the diocese of these irregularities, and Voltaire, in order to quiet matters, went through the ceremony of taking the communion in the church of Ferney; an act of undoubted hypocrisy, which however was not the only one of which he was guilty. In the following year, 1769, the bishop of Annecy had forbidden all priests to confess him, give him absolution, or allow him to take the communion. Upon this Voltaire took to his bed, pretended he was dying, and compelled a Capuchin to administer to him all the offices of the Roman Catholic Church which a true believer could claim. The whole farce was certified on the spot by a notary. The philosophers of Paris, whose anti-religious opinions went beyond those of Voltaire, looked on him with contempt, and all pious Christians were shocked by the hypocritical impiety of an old man who was now upwards of seventy years of age.

During his long residence at Ferney, Voltaire's literary activity was untiring. His rancour against priests and the Christian religion was now grown inveterate; and in the retirement of his old age he poured forth an unceasing torrent of ridicule, invective, and ribaldry against all that believers in revelation hold most sacred, and which those who refuse their belief generally treat with decent respect. His works appeared under various names, and he never scrupled to disavow them when he found it convenient, though such disavowals must have been useless, inasmuch as nobody can mistake the authorship of anything that Voltaire has written. The poem of the 'Pucelle,' which he had commenced about 1730, added to the number of his enemies. Its indecency and the ridicule of sacred things shocked all sober people; but it was the satirical allusions to living persons that raised up the most active enmity against the author. It is probable enough, as he says, that he never intended to print it in its original form; but it was well known to his friends, who had copies of some cantos, and parts of it had been recited in various companies. About 1755 it appeared in print at Frankfort, though with the title of Louvain, and Voltaire disavowed it. As usual, it had been printed from a copy which had been stolen from the author or his friends (*Avertissement des éditeurs de l'édition de Kehl*), a misfortune to which the works of Voltaire seem to have been peculiarly exposed; it is also said that it contained verses which Voltaire had not written, and, what is more probable, 'other verses which he could not allow to stand, because the circumstances to which these verses alluded were changed.' Several other editions appeared without Voltaire's consent; one at London in 1757, and another at Paris in 1759. It was not till 1762 that Voltaire published an edition of the 'Pucelle,' which was very different from all the others, and purged of much that was offensive: it was reprinted in 1774, with some alterations and considerable additions, and this is the text of the 'Pucelle' which now appears in the best editions.

His literary quarrels and his extensive correspondence also furnished the old age of Voltaire with constant employment. He had created a host of enemies, and he had to defend himself against their incessant attacks. He poured upon them invective and ridicule, without measure and without shame. He had generously offered Rousseau an asylum in his house, while he was persecuted for his 'Emile.' Rousseau refused the offer with his usual brutality, and Voltaire repaid him with a torrent of abuse. His correspondence during his residence at Ferney forms a valuable part of his works. He contributed some literary articles to the 'Encyclopédie,' which was then publishing at Paris under the direction of D'Alembert and Diderot. His correspondence with D'Alembert on the 'Encyclopédie' is exceedingly interesting; it assists us in forming some idea of the state of France at that time, in which a so-called philosophic party, inconsiderable in numbers, was opposed to a large majority of ignorant bigots and hypocritical libertines. There was enough of superstition and intolerance to excite the contempt and rouse the indignation of all reflecting men, and in estimating the character of Voltaire it should never be forgotten what the state of society then was. He had become reconciled to his old pupil Frederick, and kept up a correspondence with him, though he forgot to burn the unfortunate 'Mémoires.' He also corresponded with the empress Catherine II. of Russia, whose letters to Voltaire are some of the most agreeable in the whole collection.

But he had other occupations in his retirement, which show us another and more pleasing side of his character. He heard that a grand-niece of the dramatist Corneille was in distress. She was invited to Ferney, where she received a good, and it is said 'even a Christian education,' though the exact meaning of this expression may be doubtful. To render her in some measure independent of him, Voltaire undertook an edition of her ancestor's plays with notes; and the profits of the undertaking were given to her for her marriage portion. The affair of Calas is well known. This unfortunate old man, who was a Calvinist, was convicted at Toulouse (1762) of murdering his son, and the alleged motive was to prevent him embracing the Roman Catholic faith. The father was broken on the wheel, and the family came to Geneva for refuge. Voltaire received them kindly. He made himself acquainted with the facts of this horrible case, and was convinced that Calas was innocent. He resolved that justice should be done to the unfortunate family, and he never rested till he had accomplished this. His personal exertions, his purse, and his pen were employed in a cause which was worthy of his best powers. If his hatred of fanaticism stimulated his exertions, it must be allowed that his generous feelings also were abundantly proved. The sentence of the parliament of Toulouse was annulled, and the duc de Choiseul, who was then in power, made amends to the family of Calas, so far as reparation could be made, out of the public treasury, for the wrongs done to them by an ignorant and bigoted tribunal.

Voltaire was now eighty-four years of age. His niece, Madame Denis, who was weary of her long retirement at Ferney, persuaded him to visit Paris. He arrived there on the 10th of February, 1778, and was received with enthusiasm by all ranks, except by the court and the clergy. A succession of visitors crowded his apartments, and he was kept in a state of constant excitement. A violent hemorrhage came on and threatened his life, and he sought a reconciliation with the church: he said he did not wish his body to be deprived of Christian burial. The Abbé Gauthier obtained from him a declaration that he would die in the Roman Catholic faith, and that he asked pardon of God and the church for his sins. His disorder abated, and he transferred his thoughts from the church to the theatre, where he had been a frequent visitor since his arrival at Paris. On the evening of the day on which he was present at a sitting of the Académie, he attended the sixth representation of his tragedy of 'Irene.' Between the two pieces his bust was placed on the stage and crowned by all the actors. From the theatre he was accompanied to his hotel by crowds, who cheered him loudly, and called out the titles of his principal works, among which the 'Pucelle' was not forgotten. Turning to them, he said, 'You will stifle me with roses.' He was detained at Paris longer than he intended, chiefly owing to the management of his niece, who could not bear to return to the solitude of Ferney; but the delay was fatal. Voltaire's feeble frame was exhausted by this round of excitement; and his literary labours, which he still continued, and the immoderate use of coffee, brought on a strangury, to which he had been subject. Seeing that his strength was failing, the Abbé Mignot, his nephew, brought to him the curé of St. Sulpice and the Abbé Gauthier. The details of his death-bed are contradictory: he seems to have been exhausted, and only to have wished to die quietly. The Abbé Gauthier signed a paper, in which he declared that he was sent for at the request of Voltaire, but found him too far gone to be confessed. He died on the 30th May, 1778.. The curé of St. Sulpice officially refused to inter the body of Voltaire, but at the same time he renounced all his rights in the matter. The body was taken by night to the abbey of Scellières, which Mignot had in commendam, where it was buried, on the production of the renunciation of the curé of St. Sulpice, the certificate of the Abbé Gauthier, and a profession of 'faith Catholic, Apostolic, and Roman,' made by Voltaire about six weeks before his death. The bishop of Troyes, Joseph de Barral, hearing that it was intended to bury Voltaire in the abbey of Scellières, issued an order, dated the 2nd June, 1778, to the prior, by which he forbade the interment. The order came too late, for the funeral was over; but the prior lost his place. The letter of the prior, in reply to the bishop, states all the circumstances of the funeral, and the grounds on which he considered the body entitled to Christian burial. The bones of Voltaire remained undisturbed till the Revolution, when they were brought back to Paris and interred in the Pantheon.

The works of Voltaire are thus arranged in the edition of Lequien, Paris, 1820, 70 volumes, 8vo., of which the last volume consists of a copious index. 'Vie de Voltaire par le Marquis de Condorcet, Mémoires,' &c., vol. i.; 'Théâtre,' vols. ii.-ix., containing his tragedies and comedies; 'Discours sur la Tragédie,' addressed to Lord Bolingbroke; the translation of Shakspere's 'Julius Cæsar,' &c.; 'La Henriade,' vol. x., with the prefaces of the king of Prussia and Marmontel; 'Pucelle,' vol. xi.; 'Poësies,' vols, xii.-xiv., containing his odes and his miscellaneous poems, which are very numerous; 'Essais sur les Mœurs,' vols. xv.-xviii.; 'Siècle de Louis XIV.' vols. xix. xx.; 'Siècle de Louis XV.' vol. xxi.; 'Histoire de Charles XII.,' vol. xxii.; 'Histoire de Russie,' vol. xxiii.; 'Annales de l'Empire,' vol. xxiv.; 'Histoire du Parlement,' vol. xxv.; 'Mélanges Historiques,' vols. xxvi., xxvii.; 'Politiques et Legislation,' vols. xxviii. xxix., of which the latter contains a full account of the affair of Calas; 'Physique,' vol. xxx., which contains his physical writings, which were composed during his intimacy with Madame du Chastelet. Among these is his 'Eléméns de la Philosophie de Newton,' dedicated to Madame du Chastelet. At the time when this work was written almost all the French philosophers were Cartesians; Maupertuis and Clairaut, both of whom were then very young, were exceptions; 'Philosophie,' vols. xxxi.-xxxiv., containing his metaphysical writings; 'La Bible expliquée,' &c. His attacks on Christianity are not expressed with decency, and he is guilty of gross perversion of facts. His judgment of the philosophical writings of others is neither exact nor profound. He calls Spinosa an atheist, which he was not. Voltaire, though a deist, professed a great horror of atheism; and in reading all his philosophical and anti-religious works, it is necessary to bear this in mind. It is a great mistake to confound him with the professed atheists of his day, whom he hated, or at least affected to hate, and who viewed his deism with contempt. 'Dialogues,' vol. xxxv.; 'Dictionnaire Philosophique,' vols. xxxvi.-xlii., a work which shows his extensive and discursive reading, his fertility of invention, and his inveterate prejudices; 'Romans,' xliii. xliv., which are among his most amusing works, though in many respects far from being unexceptionable; 'Facéties,' vol. xlv., containing, among other things, 'Les Questions sur les Miracles,' in letters, the first of which appeared in 1765, and after the essay of Hume. There is nothing new in the objections of Voltaire, which are in substance that God governs by unchangeable laws, and that we cannot suppose that he permits any deviations from them. (This subject is discussed in the article MIRACLES.) 'Mélanges Literaires,' vols. xlvi., xlvii; 'Commentaires sur Corneille,' vols. xlviii., xlix.; 'Correspondance avec le Roi de Prusse,' vols. l.-lii.; the first letter is from the Prince-Royal, dated Berlin, 8th August, 1736; the last in this collection is from Voltaire, dated Paris, 1st of April, 1778, about two months before his death. 'Correspondance avec l'Imperatrice de Russie Catherine II.,' vol. liii.; 'Correspondance avec D'Alembert,' vols. liv. lv.: these three volumes are perhaps the most amusing part of his correspondence. 'Correspondance Générale,' vols. lvi.-lxix.; containing letters to and from a great number of persons of rank and literary distinction.

To estimate the character of Voltaire correctly, and his influence on the age in which he lived, would furnish materials for a large volume. He has been the subject of almost unqualified panegyric and of unqualified abuse, but he deserves neither. Education, temperament, and circumstances placed him in opposition to established institutions: his labours were directed to destroy, not to reform or rebuild. No man saw more clearly the vicious and absurd parts of existing institutions; but he could not appreciate the value of that which had been tested by experience. He had no veneration for antiquity. His habit of viewing the ridiculous side of things became so strong as to close his eyes to palpable truths. He was the great Coryphæus of deism, and he fulfilled the prophecy of his preceptor. It is not true, as it has been sometimes said, that his object was solely to root out superstition and to annihilate the power of the church. His panegyrist Condorcet distinctly states that his avowed object was to destroy Christianity, and his sceptical writings render such avowal unnecessary: this is their manifest design. He had no deep convictions, except we allow to be such his belief that a man could not perpetrate the crime that Calas was charged with, and a vague indefinite notion that human nature was better than priests and bigots supposed it to be. He had not the simplicity and sincerity of character that belong to truly great minds, and he was apparently incapable of friendship or of strong attachment, though some instances are alleged in which he retained his friendships to the close of his life. His moral character partook of the vices of the age to which he belonged; his intellectual was above it. The faults of his character pervade his writings. As a poet, he fails to move the passions strongly, nor does he touch the more delicate sympathies of our nature. His dramatic writings are defective as dramas, if we measure them by our standard of excellence. He had studied Shakspere, and he allowed him some merit, but he preferred Corneille; and some of the most undoubted characteristics of Shakspere's great dramatic art appeared to the poet of the age of Louis XV. merely the traits of a barbaric age. Yet his dramatic conception is often just and vigorous; many of his scenes have great artistic merit, and he abounds in lofty truths and generous sentiments. But an affectation of philosophy is the fault of all his writings; he would always be inculcating what he considered to be great truths, and thus we have Voltaire always before us. It is an essential of dramatic art that the author shall never appear; but in all his writings Voltaire is always apparent.

The 'Henriade' of Voltaire is still the only French epic. The subject is the siege of Paris, which was commenced by Henri III., and Henri of Navarre, afterwards Henri IV., who finally entered the city. The action is confined to Paris and the field of Ivry, which decided the fortunes of Henri IV. It has accordingly an historical basis, and the main events are made conformable to historic truth; its poetic part consists of fictions intended to aid the development of the action, and of allegories, which are feeble aids, such as the journey of Discord to Rome, and the Temple of Love. Its machinery is neither original nor grand, and it is deficient in striking events. It contains a love episode, the amours of Henri and La belle Gabrielle, which might as well have been a separate poem for any connection it has with the main subject. The 'Henriade' has been variously judged even by French critics, and the rest of Europe has pronounced on the whole an unfavourable opinion. The author worked much and long upon it; for he had the ambition of raising a monument which should stand by the side of the epic poems of Greece and Italy. To deny it all merit would be absurd; it contains many fine and vigorous passages, but of all the longer works of Voltaire it is perhaps that which, to a foreigner at least, is the most tedious, except the 'Guerre Civile de Genève,' the dullest of all his productions.

His 'Pucelle d'Orléans' has been already mentioned. The subject, if one can describe such a subject in a few words, is Jeanne d'Arc, the Maid of Orleans. The poem commences with the loves of king Charles VII. and Agnes Sorel, and the siege of Orleans by the English. Jeanne is armed by St. Dionysius, and goes to King Charles at Tours. The poem concludes, after many adventures, with the triumph of Charles. Voltaire aimed to rival Ariosto, but it is universally agreed that he has not approached him. Even in its present form the 'Pucelle' is one of the most licentious poems of modern times, for the corrections of the author principally related to the satirical allusions. All things serious and sacred are treated with ridicule. The poet riots in his licence, and seems to exult in his contempt of decencies and religion. Proprieties of time, place, and circumstance—all are disregarded; the 'Pucelle' is the reflection of Voltaire in his most lively and most extravagant mood. The poem has great merits in detail; the versification is easy, and many of the descriptions are beautiful: the exordiums of each canto are justly admired. But the 'Pucelle' has fixed a stain on the moral character of Voltaire, for which all its beauties cannot atone.

The fertility and facility of Voltaire were unequalled. His great and discursive reading supplied him with an infinite variety of matter, which he moulded into every variety of form. His satire and his sarcasm, and his [illegible] were always ready and always effective. He [illegible] to eloquence, because he is not impassioned and [illegible]

But he never sinks into triviality; he is never tiresome; he is always lively and amusing. Clearness and precision characterize all his writings. When he is superficial, which is often the case, it is rather for want of taking pains to examine his subject with sufficient care, than from want of power to comprehend it. We must except the cases where his passions were concerned, and where prejudices had become inveterate. Passion filled him with malice and bitterness, and prejudice made him blind. His historical writings and essays have great merit. He sketched with rapidity and force: he selected what was pertinent and characteristic; he omitted what was trivial and useless. He set the example of a better handling of the materials of history: he was judiciously sceptical, though sometimes, from deficient knowledge and prejudice, unwisely incredulous. He had no exact knowledge of antiquity, or even of the middle ages; yet his criticism sometimes sheds a ray of light where the dullness of mere learning has left nothing but darkness. His writings contributed greatly to the amendment of the penal law of France, and to the destruction of many absurd prejudices. That they tended to destroy also many of those notions on which society reposes for its safety, is not and cannot be denied. The prodigious activity and unwearied industry of Voltaire, his long and brilliant career of literary success, and the influence which he exercised on his own generation and that which immediately followed, have made him one of the most conspicuous personages of the eighteenth century. He has still many readers, and probably will always have some. His best writings please by the mere charm of form, independent of the matter, and they are stamped with the impress which genius alone can give. The influence of his opinions is probably not great at present. He is not the writer for all ages: he belonged to his own age, and that is passed.

(*Vie de Voltaire*, par M. le Marquis de Condorcet; *Mémoires pour servir à la Vie de M. de Voltaire*, écrits par lui-même; *Eloge de Voltaire*, par M. de la Harpe; *Biographie Universelle*, art. 'Voltaire;' *Œuvres Complètes de Voltaire*, Paris, 1820, 70 vols. 8vo.)

VOLTAISM. The leading facts and principles of electrical science have been given in the several articles ELECTRICITY; ELECTRO-CHEMISTRY; GALVANISM; MAGNETISM; &c.; but so rapid is our progress in this branch of knowledge, that the present title has been retained to allow this subject being further elucidated: for this purpose the general phenomena of Voltaic or electro-chemical action will be recapitulated.

If two flat pieces or plates, one of zinc, the other of copper or platinum, be immersed, without touching each other, in diluted sulphuric acid, chemical action, as it is termed, will take place between the zinc and fluid; the water of the latter undergoing decomposition, its oxygen unites with the metal to form a protoxide, while the equivalent of hydrogen is set free, but adheres to the surface of the plate in small bubbles, which gradually coalescing into larger, detach themselves and rise to the surface from their specific levity; the protoxide combines with an equivalent of acid, forming a soluble salt, which, being consequently removed, allows of renewed and continuous action on the metal. In time however the fluid becomes saturated with the sulphate of zinc, which is then thrown down undissolved, and is also deposited on the surface of the plate, acting mechanically to prevent that intimate contact between the pure metal and the water which is essential to chemical action; this obstruction is also in some measure occasioned from the beginning by the adhesion of the bubbles of hydrogen, and consequently that action is gradually retarded and finally ceases. During this time the copper or platinum plate is perfectly inactive, neither of these metals being affected by sulphuric acid, or more properly, owing to the affinity, as it may at present be still called, between those metals and oxygen, being weaker than that which exists between the hydrogen and that element.

Under these circumstances, if a perfect communication be made between the two metals, by causing a wire soldered to the one, to touch that connected with the other, a remarkable change takes place in the phenomenon, the chemical action between the zinc and fluid becomes more energetic, but the hydrogen, instead of being liberated at the surface of that metal, appears solely at that of the other, although not the slightest effect is produced on the copper or platinum itself; while the connecting wires will be found to exhibit, by their increased temperature and their magnetic state, the usual indications of, what is termed, an electrical *current* passing along them, and, as is well known, an electric spark is visible at the instant of separating the wires, provided the plates be sufficiently large.

It is now generally admitted that all chemical is connected with electrical action, and that they bear a direct relation to each other, that is, a certain constant quantity of electricity is evolved by the decomposition of each equivalent of any compound, though that quantity varies for different bodies; but it is not clearly known whether the electricity is the cause or the effect of the chemical action, they being perfectly contemporaneous and co-existent to all our means of observation. It follows therefore that the quantity of electricity varies with the extent of surfaces between which the action takes place, as well as with the nature of those surfaces; but with the same two metals and fluid this quantity depends solely on the extent of surface, that is, on the size of the zinc-plate.

It has been proved by Professor Daniell that under these circumstances our power of collecting or retaining the electricity evolved from any given surface of metal, depends on the extent of that of the other, or conducting metal, for in the arrangements under consideration the copper or platinum plate simply acts in this capacity, and that this second plate cannot be too large in proportion to the former, to prevent the loss of any of the evolved electricity, which, if it do not meet with a good conductor in its immediate proximity, passes off to some other.* The form of our arrangements puts a limit to this inequality in the extent of surfaces of the generating and conducting metals, but a more important principle still further contracts this limit, which must be briefly adverted to.

All electrical action is most easily and consistently explained as the effects of induction [POLARITY], or of an action exerted by matter, itself in a polar state, producing polarity in surrounding matter; what is commonly called an electrical current is, on this hypothesis, the momentaneous destruction and reproduction of polar forces, acting along a chain of particles sufficiently approximated to admit of the intensity of the forces in that line exceeding that produced on contiguous particles in other and lateral directions. In the voltaic circuit the particles of the fluid form a part of the chain through which the induction originated by the zinc on the fluid, is propagated, the chemical decomposition is connected with or occasioned by this polarity, the hydrogen of one particle of water quitting its equivalent of oxygen to combine with that of the contiguous particle, and so on throughout till the hydrogen of the particles in contact with the conducting plate, having no oxygen wherewith to combine, is liberated at that surface in its gaseous state; the metallic part of the circuit undergoes no chemical change except at the surface in contact with the fluid, where the polar forces produce oxidation of the metal, and consequent decomposition of that fluid.

If this chain of polarized particles be broken, and the interposed matter be a nonconductor, the current is at once arrested, and the chemical action between the zinc and the fluid nearly ceases; but even a diminution in the conducting power of any part of the circuit occasions a diminution or retardation of that action. The fluid of the arrangement is an imperfect conductor, compared with the metallic part, and if the distance between the metals be increased, the increase of the intervening portion of imperfect conducting matter may occasion a cessation of the action, and always diminishes it in an inverse ratio to that distance. Hence the necessity in all forms of *voltaic batteries* for diminishing as much as possible the quantity of fluid between the metallic elements: consequently the magnitude of the negative or conducting plate cannot be indefinitely increased, if by so doing it becomes necessary, owing to the peculiar form of the arrangement, to increase the distance between the two plates.

Although we are warranted in inferring by analogy that there may be other chemical sources of electro-polar induction than oxidation of a metal, yet at present we are not acquainted with any other that can at all be compared with it in energy; and, of all combinations by which this xidation may be produced, the most efficient is that of a netal and a solution of a metallic salt, the acid of which ias a greater affinity for the former metal than it has for hat with which it is combined. If therefore a solution f sulphate of copper be used, instead of the simple diluted ulphuric acid of the arrangement, it becomes far more owerful; but this substitution necessitates a precaution to revent the deposition on the surface of the zinc plate f the metallic copper liberated by the decomposition, which deposition would otherwise almost instantly take lace, and thus, by causing both surfaces to consist of the ame metal, polar currents would be produced in opposite lirections, which would neutralize each other's action.

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* If a large electrical machine were provided with a small conductor, this might become charged by half a turn of the handle, and must discharge itself laterally to the nearest conductors before it could receive a fresh charge.

The precaution alluded to consists in interposing beween the decomposing plate and the metallic solution a ubstance which, while it admits of the passage of the urrent, and even that of the pure fluid under the influence f that current [Endosmose], mechanically intercepts the olid copper; the arrangement of the 'constant battery,' s it is technically termed, for which we are indebted to Professor Daniell, consists of a small rod of amalgamated inc, that is, of zinc the surface of which is coated over vith mercury, placed in a membranous bag, or in a porous arthenware cylinder, filled with dilute sulphuric acid, this ylinder or bag being again placed in a copper one filled vith a saturated solution of sulphate of copper; this exernal copper vessel constitutes the conducting plate, and as the connecting wire soldered to it, while the other vire is attached in any convenient mode to the zinc rod. t must be observed that the membrane or porous cylinder nust be perfectly continuous: the least fissure would adnit of the passage of the copper to the zinc, and destroy he effect.

As long as the two wires do not touch, this battery is early quiescent, except the slight local action which akes place between the zinc and its surrounding fluid;* ut when the circuit is completed by making the ends of he wires touch, the action becomes energetic, the soluion of the sulphate of copper is decomposed, the reduced netal being deposited on the surface of the copper vessel; t is consequently necessary to keep up the supply by dding from time to time solid sulphate to the solution, so s to keep it always saturated; for it must be distinctly nderstood as a fundamental principle, that, without coninuous chemical decomposition and recomposition, no current or circle of electro-polar forces can be maintained.

Let the ends of the two wires, not in contact, be plunged into a liquid compound, such as sulphate of copper in solution, for example, which, being an imperfect conductor, is capable of decomposition; decomposition of t will accordingly take place, and in the same direction s that in which it occurs in the fluid of the battery; that s, the copper of the solution will be determined to or precipitated on the wire connected with the zinc plate, while the other wire will be dissolved, uniting with the free acid to produce a sulphate. It may be asked how it happens that the copper wire is dissolved while the plate of that metal in the battery is not acted on, and what becomes of the hydrogen which was liberated in a free state, when dilute acid alone was employed. This apparent contradiction is explained by an attentive consideration of the constant direction of the current, and the consequences of its passing through the two portions of fluids in opposite directions as regards them. At the zinc plate the action is the same as before, but by virtue of the current-affinity the copper is determined to the conducting plate instead of the hydrogen, which plate therefore remains unacted on; in the other portion of fluid the wire connected with the copper plate becomes the analogue of the zinc, and the water undergoing decomposition at its surface, the oxygen unites with the copper of the wire to form a protoxide, which combines with the free sulphuric acid, while the copper of the sulphate is again determined in the direction of the current, in preference to the hydrogen, to the surface of the other wire.

This example explains why, during electrolytic decomposition, the elements of a compound are determined in definite directions to one or other pole of the battery: and hence the classification of those elements into electro-positive, or electro-negative, or into Cathions and Anions, according to the nomenclature proposed by Professor Faraday. [Electro-chemistry.]

When the elements of a voltaic arrangement are single, or when it consists of a pair of plates only, the current, however abundant as regards what may be called *quantity*, is deficient in *tension*, or in that quality which pre-eminently characterizes electricity of friction: an increase of tension, as well as of quantity, is obtained by combining two or more single batteries, the copper element of the one being connected with the zinc of the next by a perfect conductor, and so on in continued succession. In constructing such compound arrangements, or batteries, it must not be inferred that the quantity and tension depend simply on the extent of the surface of the plates taken collectively, and on their number; it has been proved by Professors Daniell, Faraday, and others, that the maximum effect is obtained from a given amount of surface and a given number of combinations, when all the plates are exactly equal; and that if one pair of the series is much larger or smaller than the rest, there will be no additional power gained in the first case, and a considerable loss in the second nearly equal to what would have been produced if all the plates had been reduced to the size of the smaller.

The term *tension*, as applied to the property imparted to the voltaic current by compound combinations, is, perhaps, an injudicious one; since it suggests the idea of some resemblance to the quality of frictional electricity alluded to, which, as will be presently stated, is not precisely the case, but that a very decided modification of the active qualities of the current is produced by these combinations is shown by the fact that the decomposition of a fluid electrolyte into its constituent elements cannot be effected by a single pair of plates, however extensive their surface; while this decomposition becomes energetic by means of a combination of four or five small batteries the total surface of the plates of which is far less than that of the single one.

The most energetic form of small constant battery is that suggested by Mr. Grove, the elements of which are amalgamated zinc and sheet platinum, the latter being immersed in concentrated nitrous acid, while the zinc element is plunged in dilute hydrochloric and isolated by porous chambers. The platinum is not acted on, and consequently the plates are lasting, although costly at first. The zinc is of course rapidly destroyed, as it must be in all energetic arrangements, for reasons before given.

In constructing the *science* of electricity, the mind has, as in other sciences, proceeded from first observed facts to simple generalizations, or *theory*, which have again served as guides to new observations and more comprehensive generalizations. Small as the progress yet made, and slight as our knowledge is, when compared with what remains to be acquired, we are warranted in concluding, from the steady adherence to the principles of inductive philosophy which has long characterized our investigations, that the present *theory* of this science will be an admitted one, divested as it is, and ought to be, of any attempt to explain ultimate causes, and limited to comprising in general expressions the combined results of past observations, to be tested by its accordance with new ones as they occur. What electricity is, or more correctly speaking, what is the nature of that unknown agent which is the cause of electrical action in the most comprehensive sense of this term, we are utterly, and probably ever shall be, ignorant; but this agent appears to be as inseparable from matter as gravitation, and polarity appears to be the consequence of its presence in an active state. It can be elicited, or brought into this active state, by different causes, and what is remarkable, it presents some striking modifications in its sensible properties, according to the cause which has immediately called it into action; it was these modifications which prevented its recognition when first obtained by chemical action, or by other than mechanical means, and caused it to be denominated galvanism, or voltaism, and yet longer concealed the constant connexion, if not identity, between it and magnetism.

That the ultimate cause of these modified modes of action is identical, we are warranted in inferring from the identity of the phenomena which they all produce, and from the interchangeable relation of cause and effect that exists between these various sources of electrical excitation; thus we infer that the unknown agent alluded to is the cause of electricity, voltaism, magnetism, and heat, for each of these may be produced, and each in its turn is capable of producing the others. Friction is the source of an electrical action which produces light, heat, chemical action, and magnetism, but chemical action is the most abundant source of this agent, and all these phenomena are produced more freely by it than by the others; nevertheless the presence, even in the least appreciable degree, of any one of them, warrants us in admitting the identity of the cause. Magnetism is always co-existent with the agent alluded to, but under certain conditions of direction of the electrical and magnetic polarities. Whether that agent be elicited by mechanical or chemical action, or by changes of temperature in different metals [THERMO-ELECTRICITY], and conversely by employing magnetism as the immediate exciting cause, chemical action, heat, light, and magnetism itself may be produced. [MAGNETO-ELECTRICITY.]

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* The object of amalgamating the zinc rod is to prevent this local action, which arises from the inevitable want of perfect homogeneity in the metal; any the slightest difference in two portions of which will cause them to act as positive and negative elements of a small circuit, and a great number of these causes that action on the zinc which takes place before the great or principal circuit is completed; the perfect conducting power of the mercury appears to destroy or neutralize these partial currents, as that of the battery itself would be destroyed if the two plates were connected within the fluid by a perfect conductor, instead of having an imperfect one interposed between them.

The most remarkable and obvious of the modifications which have been above alluded to are those which have given rise to the terms *electricity of tension*, and *current-electricity*, the former characterising frictional or mechanical, the latter chemico-, thermo-, and magneto-electricity; but it is now acknowledged that these terms are only expressive of the highest and lowest degrees of a common property. The spontaneous disruptive discharge which takes place through very imperfect conducting media, such as dry gases, from a body supercharged with frictional electricity, has never yet been produced by the most redundant quantity of chemico-electricity. Contact must be made by some good conductor before the *current* can pass; although the current will continue for a short time after that contact is again broken, but only through a small intervening space, never exceeding an inch or two, between the anode and cathode, the continuity of the current under these circumstance being indicated by the intense arc of flame between the points terminating the connecting wires of an extensive compound battery; and in the case of thermo- or magneto-electricity it is only at the instant of breaking the contact that the spark appears, indicating the momentary transit through an unappreciable distance of the current, which is instantly arrested when that distance becomes sensible: yet that the electricity from these three sources possesses some tension has been proved by the charge imparted to a Leyden jar from a voltaic battery, and by other indications of the presence of that quality in feeble degrees, both in thermo- and magneto-electrical currents, as for example by the decomposition of solution of iodide of potassium when the anode and cathode are very near to each other.

That power to which the name of induction is given, and which is the consequence of the more comprehensive agency termed polarity, is another and universal characteristic of electrical action. The inductive power of frictional electricity and of magnetism were the earliest observed facts in the science, but it is only within a few years that the same power has been shown to accompany the other sources of excitation, owing to the low degree in which they possess it when compared with the former: but now by means of the multiplier or coil, the inductive power of the current from a single pair of plates may be made manifest, especially by the physiological action called the electrical shock, which thus modified cannot be distinguished from that obtained from a charged Leyden jar.

In conclusion we must briefly notice another source of electricity, namely *vitality;* are we yet warranted in assigning this as another effect of the same agent? This question cannot be answered; all we as yet know is, that animal electricity as exerted at volition by the Gymnotus, Torpedo, and perhaps other animals, is capable of producing induction, and therefore attraction, heat, light, chemical action, and magnetism, and the physiological action on living bodies, identically in the same manner as the electricity from inorganic sources.

VOLTERRA, the antient Volaterræ, a town of Tuscany, is built on the site of one of the most antient of the Etruscan cities. Volaterræ is first mentioned by Livy (x. 12) under the year B.C. 298, when the people fought bravely against the consul L. Cornelius Scipio. It became eventually a municipium, and furnished the commissariat with the provisions and stores for the army which Scipio led against Carthage. It was probably after this that they struck money with the elephant and moor's head on the obverse, as commemorative of Scipio's victory over the Carthaginians. It has been conjectured however that this coin commemorates the defeat of Hannibal, in which many of the Etruscan cities took part. The people of Volaterræ, having espoused the party of Marius, were besieged by Sulla two whole years. The city suffered severely from the invasion of the Vandals; and after them it came under the dominion of the Lombards, who were driven out in the eighth century by Charlemagne. In the division of the cities of Tuscany between the empire and the church, Volterra fell to the former, and was governed by the counts, marquisses, or officers of the emperors, who often deputed the bishops of the diocese to administer the government. This mode however gave rise to fierce disputes and disorders, in which sometimes the bishops lost their life. Like other cities of Italy, Volterra was torn by the contending factions of the Guelfs and Ghibellines. The former having prevailed, the Volterrani were induced to unite themselves to the Pisan republic. From 1252 to 1531 the history of Volterra is a series of intestine commotions and civil wars, which were common in that period of Italian history.

Volterra is 50 miles from Leghorn, about 40 from Florence, and 30 from Siena. The city, or rather town, is situated on a mountain, the west sides of which are extremely precipitous, and, owing to the soft nature of the material, a species of marl, are continually wearing away and encroaching on the site of the town. From the towering height on which the town stands an extensive tract of barren hilly country is visible, worn with the action of rain on a loose soil into numerous ravines extending almost as far as the eye can reach, and abounding in fossils. It is this circumstance which makes the approach to Volterra so circuitous; the nearer you approach, the farther you seem to recede. On the north and east side, below the precipitous ramparts on which the town is built, the landscape consists of gentle slopes divided by ravines and covered with olive-trees; beyond these are chains of rugged mountains. On the north, and precisely on these slopes, consisting of tufa-rock covered with a thin coat of earth, are found the numerous sepulchral chambers, called by the Italians 'Ippogei,' to which Volterra owes its remarkable and unique museum of cinerary urns or sarcophagi. From these urns some knowledge of Etruscan customs may be collected. On the south side of the city there is an extensive view of the Maremma of Volterra; in the distance is Monte Catino, famous for its copper-mines, and in the same direction is seen the smoke arising from a volcano. All the country in that direction produces large quantities of salt, which is monopolised by the government.

A most interesting public museum, but extremely difficult of access, consisting of cinerary sarcophagi, gold ornaments, gems, weights, bronzes, coins, and objects in terra-cotta, has long been formed in Volterra. Some fragments of walls and columns and an arched gateway of Etruscan workmanship are all that now remain of the antient constructions. The gate is probably a part of the earliest constructed wall, which probably enclosed only the higher part of the antient city, forming an acropolis. The other fragments of walls were possibly parts of a later construction, or a second enclosure consequent on the increased prosperity of the city, though from their massive style they must be considered Etruscan. The huge blocks of stone in both instances are uncemented. The Etruscan arch is decorated with three human heads; one adorns the keystone, and two are carved on the springing stone of the arch above the impost; the impost itself retains its mouldings in excellent preservation. A good representation of this gate and the walls is given on one of the cinerary urns in the museum at Volterra. There may have been something mystic about these heads, as we find them represented with the arch on a large gold fibula, or buckle, discovered in one of the sepulchres.

The modern city is walled, and possesses a fortress partly constructed on the site of the antient Etruscan walls. Within the fortress is a circular tower called the Mastio, which has served as a state prison, notorious in Tuscany for its horrible dungeons, in one of which Lorenzo Lorenzini, the mathematician, was confined from 1682 to

1683, and where also he wrote his treatise on geometry in twelve books.

Volterra contains also a cathedral, several churches, a theatre, two inns, several palaces, a Monte di Pietà, or public pawnbrokery, an antiquated town-hall, called the Palazzo de' Priori, begun in 1208 and finished in 1257. In this building, on the ground-floor, is the museum of sarcophagi found in the tombs, and above is placed the public library. A gloomy palace, constructed in the tenth century, was the residence of the Capitano di Giustizia, when Volterra was a free and independent city: it afterwards became the residence of the podestà, or mayor. This building has been the theatre of many scenes of violence. In 1472 Paoli Inghirami, Capitano di Giustizia, and his companions or party, having during an insurrection shut themselves up in the higher tower, which still exists, with its four columns on the top, similar to the Tower of the Traitors at Florence, were there suffocated with the fumes of sulphur and bitumen, and their dead bodies were thrown down into the square below, where they were torn to pieces by their fellow-citizens. (Torrini, *Guida per la Città di Volterra*, 1832.) The streets are narrow, and, except the main streets, badly paved; the houses are often of great antiquity, consisting in many instances of towers modernized. The population may be about 5000.

The climate is more temperate than that of Leghorn or Florence.

Volterra, like Chiusi, has been the great depository of cinerary urns. The Etruscans generally burnt the bodies of their dead, and placed the ashes in boxes or sarcophagi of tufa, alabaster, or terra-cotta; the two former, and especially the alabaster, are found in abundance at Volterra. These boxes are formed with a lid, which may be taken off, and are often adorned with bas-reliefs in front; on the lid itself is often represented a recumbent figure, with a patera in one of the hands, or a fan similar to those depicted on small fictile vases. These boxes or urns were ranged round the interior of the 'Ippogei,' or vaults cut out of the solid rock; the vaults are sometimes circular and sometimes square on the plan, and generally consist of one room; small recesses are occasionally found formed in the sides of the vault. The urns were placed on steps rising one above another round the vault, whilst in the centre a column or pilaster was left in the tufa, against which were often placed other cinerary urns. As many as forty and even fifty sarcophagi have been found in one of these caves.

A more particular description of one of these will give some idea of the manner in which the sarcophagi were disposed. The entrance to the vault was down steps cut in the rock, leading to a doorway, which was closed with a large stone. At the entrance was placed an upright stone or cippus, on which is often found an Etruscan inscription.

Many of the urns, independent of their sculpture, have been decorated with gilding and colour, especially in their architectural ornaments. With the urns are found terra-cotta and bronze vases, lamps, candelabra of iron and lead, gold ornaments, and brass utensils, as well as the arms of the warrior.

In the same Ippogeo are found urns with both Etruscan and Latin inscriptions, by which it is ascertained to what Roman family some of them eventually belonged. Sarcophagi have also been found of a large size, with the entire skeleton, instead of the burnt ashes. These may be contemporary with the Scipios, as we know from the tomb of Scipio at Rome that the bodies deposited there were not burnt.

The museum at Volterra contains more than four hundred of these urns; forty-four are deposited in the museum at Florence, and a vast number have been dispersed among private museums. In addition to these, a great many were destroyed or allowed to perish during and after the early excavations. Though the urns are principally of alabaster and tufa, yet there are also a few rare examples of terra-cotta. The covers of some of the urns are made in the shape of the roof of a house, having the representation of tiles. The subjects of the bas-reliefs are mostly mythological, and are often designed and executed in a masterly manner. An antient Etruscan bas-relief of a large size, preserved in the museum, is remarkable for its close resemblance to the figures of the Persians carved on the frieze brought from Persepolis, and now in the British Museum.

The chief business of the Volterrani is the carving of alabaster; but though they have these singular and beautiful monuments before them, we have never heard of their copying or adapting them to the vast quantities of carved ware with which they supply the markets of Florence, Leghorn, and Pisa.

VOLTERRA, DANIEL DI. [RICCIARELLI.]

VOLTZITE. [ZINC.]

VOLUME. This word, as meaning a part of a book, is derived from the old form of a book, a roll (of parchment). But our language takes from the French a sense of which the Latin knows nothing; and *volume* means bulk, size, or solid content. Thus the volume of a sphere is two-thirds of that of its circumscribed cylinder: the volume of a cone is one-third of that of a cylinder of the same base and altitude, and so on.

Under the various words, PRISM, CYLINDER, CONE, SPHERE, &c. will be found the modes of ascertaining their volumes. The mode of finding the volume which is contained under a given surface is a process of the integral calculus, which it would be useless to attempt describing within any limits we could afford.

VOLUNTARY SETTLEMENT. [SETTLEMENT.]

VOLUTA. [VOLUTIDÆ.]

VOLUTE, a rolling or spiral curve, a name particularly given to the spirals which appear in architectural columns, as ornaments of the capitals. The Ionic volute (figured in COLUMN, p. 384) is that which is of most interest. There has been, we believe, some discussion as to what the form of this curve really was. Whether the architect of a Greek temple employed anything but his eye to give an agreeable form, we do not know; but a mathematician would say beforehand that it would be hardly possible to draw such a number of concentric spirals not interfering with each other as are seen in the diagram above cited, unless each of them was tolerably near to a logarithmic spiral, in which the tangent always makes the same angle with the radius. We examined with particular attention a cast made at Athens by Professor Donaldson, and found the following result:—Taking the diagram in COLUMN (p. 386), we found that each spiral, as far as C, or thereabouts, was remarkably true to the logarithmic spiral: but that from C the law of the curve changed, and the acute angle made by the tangent with the radius vector began to increase, until it became a right angle at A.

VOLUTELLA. [VOLUTIDÆ.]

VOLUTIDÆ, the name of a family of testaceous gastropodous mollusca, whose shells are prized by collectors above most others for their beauty and rarity; and which, from their numbers and carnivorous habits, are powerful agents in keeping other *mollusca* and *conchifera* within due limits.

The genus *Voluta* stands, in the last edition of the *Systema Naturæ*, revised by Linnæus, between the genera *Bulla* and *Buccinum*, with the following definition:—

Animal, a Limax or Slug. *Shell* unilocular, spiral. *Aperture* ecaudate, subeffuse. *Columella* or Pillar plaited. No labium nor umbilicus.

Linnæus thus subdivides the genus:—

* Aperture entire.

Species:—*Auris Midæ*; *Auris Judæ*, *tornatilis*; *solidula*; *livida*; *coffea*.

* * Cylindroid (subcylindrical and emarginate).

Species:—*porphyria*; *oliva*; *ispidula*.

* * * Ovate (obovate, effuse, emarginate).

Species:—*dactylus*; *miliaria*; *monilis*; *persicula*; *pallida*; *faba*; *glabella*; *reticulata*; *mercatoria*; *rustica*; *paupercula*; *mendicaria*; *cancellata*.

* * * * Fusiform.

Species:—*tringa*; *corniculata*; *virgo*; *scabricula*; *ruffina*; *sanguisuga*; *caffra*, *morio*; *vulpecula*; *plicaria*; *pertusa*; *mitra*; *musica*; *vespertilio*; *ebræa*; *turbinellus*; *capitellum*; *ceramica*; *pyrum*; *lapponica*.

* * * * * Ventricose.

Species:—*æthiopica*; *cymbium*; *olla*.

In Gmelin's edition the number of species is increased to one hundred and forty-five, and these additions will all bear the test laid down by Linnæus as characteristic of the genus *Voluta*, for they have all plaits upon the pillar.[*]

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[*] 'Volutæ genus facillime distinguitur columella plicata.' (Syst. *Nat.* ed. 12, p. 1195.)

Lamarck, in his *Animaux sans Vertèbres*, truly observes that the genus *Voluta* of Linnæus, although characterised in a manner sufficiently distinct by the plaits on the pillar of the shell, is far from natural; for it unites shells of different families, which ought to be separated because they do not approximate at all. It comprises, says Lamarck, in fact, shells with an entire aperture, as the *Auriculæ*, others with an aperture which is canaliculated at the base, as the *Fasciolariæ*, and the *Turbinellæ*, which approach the *Murices*; others again whose aperture is simply notched at the base, like that of the *Buccina*: this gives an extremely considerable extent to the genus, injurious to the study of species, and defective in regard to the relationship of the component forms.

Mr. Broderip, in his introduction to the monograph of the subgenus *Cymba*, in the *Species Conchyliorum*, remarks, that if any disciple of Linnæus should be disposed to consider the French naturalist somewhat severe, he should remember that, at the time when Lamarck wrote (1822), the number of recent species of *Volutæ*, strictly Linnean, had increased from forty-five to two hundred and eighty-eight, viz. *Voluta*, Lam., 44; *Mitra*, 80; *Marginella*, 22; *Turbinella*, 25; *Columbella*, 18; *Auricula*, 14; *Cancellaria*, 12; *Tornatella*, 6; *Volvaria*, 5; *Oliva*, 62.

Since the appearance of Lamarck's work, the researches of naturalists have brought to light such numbers to swell the catalogue, that the species of many of these genera had, when Mr. Broderip wrote (1830), increased two-fold and even three-fold; and the last twelve years have added greatly to that amount.

The first effectual reformer of the Linnean genus *Voluta* was Bruguières, who separated from it all the species which were without a notch at the base. Lamarck carried the reformation further, and separated from it the genera *Mitra*, *Columbella*, *Marginella*, *Cancellaria*, and *Turbinella*, leaving only those shells that constitute his genus *Voluta*, an assemblage of Trachelipods, all marine, carnivorous, and breathing through the medium of sea-water only; with plaits on the pillar of the shell, and a notch at its base, but destitute of an operculum. Of the genus thus modified, Linnæus recorded seven species only and Lamarck forty-four; the increase since has been great.

Lamarck thus divided his genus *Voluta*:—

a. Shell ventricose, convex (bombée).

Les Gondolières (Cymbiolæ).

The species of this section belong mostly to the subgenera *Cymba* and *Melo* of Broderip.

b. Shell oval, spiny or tuberculous.

Muricinæ.

Comprising *Volutæ imperialis, vespertilio, mitis, nivosa*, &c.

c. Shell oval, tuberculous.

Musicales, the Music Shells.

Consisting of *Volutæ ebræa, musica*, &c.

d. Shell elongated, ventricose, nearly fusiform.

Fusoideæ.

Consisting of *Volutæ magnifica, ancilla, pacifica, junonia, lapponica*, &c.

Cuvier observes that the Volutes (*Voluta*, Linn.) vary in the form of the shell and that of the aperture; but are to be recognised by the notch without a canal which terminates it, and by the projecting and oblique plaits on the pillar. The following subdivisions appear in Cuvier's work:—

The Olives (Oliva, Brug.).

These are named from the oblong or elliptical form of their shell, whose aperture is narrow, long, notched at the end opposite to the spire, which last is short. The plaits of the pillar are numerous and resembling striæ. The whorls are hollowed into a furrow. The shells of this genus do not yield in beauty to those of the Cowries.

The animal of *Oliva* has a large foot, whose interior part (in front of the head) is separated by an incision on each side; the tentacles are slender and carry the eyes on the side, about the middle of their length. The proboscis, the siphon, and the penis are long. There is no true operculum. MM. Quoy and Gaimard observed at the posterior part an appendage which is introduced into the furrow of the whorls.

Volvaria, Lam.

These much resemble the Olives in their oblong or cylindrical form; but their aperture is narrow, and its anterior border ascends above the spire, which is excessively short. One or more plates at the lower part of the pillar. The polish and whiteness of these shells cause their employment as necklaces on some coasts.

The Volutes properly so called (*Voluta*, Lam.).

Cuvier characterises the genus *Voluta*, Lam., as having a shell with an ample aperture, and the columella marked by large plaits, of which that which is farthest from the spire is largest. The spire, he observes, varies much in the extent of its projection.

Some of this genus, continues Cuvier (*Cymbium*, Montf. *Cymba*, Brod.), have the last whorl ventricose. Their animal has a large, thick, fleshy foot, without an operculum, and on the head a veil, at the sides of which are the tentacles. The proboscis is rather long and its siphon has an appendage on each side of its base. The shells grow to a large size, and many are very beautiful.

Others (*Voluta*, Montf.) have the last whorl conical narrowing towards the end opposite to the spire. Their animal has not so large a foot as the preceding: their shells are also often very remarkable for the beauty of their colours or the patterns traced thereon.

Marginella, Lam.

With the form of the Volutes properly so called, these have the external lip of the aperture furnished with a *bourrelet*. Their notch is but little marked. According to Adanson, their animal, also, has the foot very large, and wants the operculum; it partially covers the shell by raising the lobes of the mantle. The tentacles carry the eyes on the external side of the base.

Columbella, Lam.

The plaits of the pillar are numerous, and the bourrelet of the external lip is convex or swollen as it were on its middle. These seem to have no operculum.

Mitra, Lam.

These have the aperture oblong with some large plaits on the pillar; the plaits nearest to the spire are the largest. The spire is generally pointed and elongated: some of the species are beautifully spotted with red on a white ground. Their animal has a small foot; the tentacles, of moderate length, carrying the eyes on the side about the lower third: there is also a siphon of moderate length; but there is often a proboscis longer than the shell.

Cancellaria, Lam.

The last whorl of these is ventricose, the aperture ample and round, and the internal lip forms a plate upon the pillar. Their spire is projecting, pointed, and the surface generally marked with cancellations. (*Règne Animal.*)

In Cuvier's system the Volutes are placed between *Terebellum* and *Buccinum*.

Of the Gastropods now usually arranged under the family *Volutidæ*, M. de Blainville places *Oliva* next to *Terebellum*. *Ancillaria*, *Mitra*, *Voluta*, and *Marginella* come in succession after *Oliva*. All these genera belong to M. de Blainville's third family, *Angyostomata*.

The genus *Oliva* is divided by this zoologist into the following sections:—

A. Oval species, with the spire scarcely projecting.

Example, *Oliva unduta*.

B. Species a little more elongated, with the spire more projecting.

Example, *Oliva litterata*.

C. Species still more elongated (elancées), with a very projecting spire.

Example, *Oliva subulata*.

Ancillaria is divided by him into the following sections:—

A. Species with the spire sufficiently elevated and bucciniform.

Example, *Ancillaria buccinoides*.

B. Species with the spire almost null.

Example, *Ancillaria cinnamomea*.

Mitra is thus subdivided:—

A. Species elongated, turriculate, ribbed; the aperture very narrow, long, subcanaliculate, with a plait. (Genus *Minaret*, Montf.)

Example, *Mitra tæniata*.

B. Turriculate species, with large spiral whorls, the aperture effuse anteriorly.

Example, *Mitra episcopalis*.

C. Suboval species, with a shorter spire, ordinarily tuberculous.

Example, *Mitra microzonias.*

D. Oval species, with a very short spire, and ordinarily trellised.

Example, *Mitra dactylus.*

Voluta consists of the following sections :—

A. Elongated and subturriculate species.

Example, *Voluta magellanica.*

B. Oval species more or less tuberculous. (Genus *Turbinellus*, Oken.)

Example, *Voluta imperialis.*

C. Oval species, coroneted or not.

Example, *Voluta fulva* and *Voluta nivosa.*

D. Oval, convex, ventricose species. (The *Gondolières*, *Cymbium*, Montf.)

Example, *Voluta æthiopica.*

Marginella is subdivided as follows :—

A. Species with the aperture less long than the shell, and with the spire apparent. (*Marginella*, Lam.)

Example, *Marginella faba.*

B. Species with the aperture as long as the shell, with no spire, and sometimes with it sunk or umbilicated.

Example, *Marginella lineata.*

C. Species which are still more involved; the aperture still narrower and longer; folds on the anterior part of the columellar lip; external lip delicate.

Example, *Mitra monilis.*

M. Rang thus defines the family of Volutes, which he makes his eighth family, placing it between the *Enroulés* of Lamarck and the *Sigareti*, thus :—

Animal furnished with triangular and flattened tentacles, carrying the eyes on the hinder part of them on the external side.

Shell oblong, with a large aperture, and furnished with plaits on the pillar.

Marine.

Genera *Voluta* and *Cymbium.*

The genus *Voluta* is thus defined :—

Animal oval; the head distinct, furnished with triangular and rather short tentacles, with sessile eyes at their base, placed a little backwards; mouth at the extremity of a thick proboscis furnished with hooked teeth; foot very large and spreading, on all sides, beyond the shell, folding longitudinally in order to re-enter it; branchiæ composed of two pectinations; anus sessile.

Shell oval, rather ventricose, with the spire rather elevated and mammillated; aperture large, longer than it is wide, notched anteriorly; right lip arched; columella excavated, furnished with oblique plaits, the anterior of which are the greatest.

Following the example of Lamarck, M. Rang subdivides he genus into three groups :—1. The *Muricines*—*Voluta imperialis*, &c. 2. The *Musicales*—*Voluta ebræa*, &c. 3. The *Fusoïdes*, *Voluta magnifica*, &c.

The genus *Cymbium*, Adans.—M. Rang defines thus :—

Animal oval, very convex, hardly capable of re-entering the shell, and spreading beyond it on all sides with its foot, which is very large: head furnished with a veil, whence issue two triangular and flattened tentacles with eyes situated at the external base of those organs, a little towards their external parts; an advanced proboscis with he mouth at its extremity.

Shell oblong oval, very ventricose, rather delicate; spire generally short and mammillated; aperture very large, onger than it is wide, notched anteriorly; right lip arched, renchant; left or columellar lip excavated, furnished a ittle anteriorly to its middle with oblique plaits.

M. Rang remarks that this genus approaches closely to he preceding; but, at the same time, he states that he ould find no veil in the animal of the Volutes, and that f *Cymbium* is evidently provided with it. Upon this ground alone M. Rang separates the genera; for, if the nimals were the same, the species of *Cymbium* ought not o form more than a subgenus of *Voluta.* M. Rang furher observes that Lamarck reckons fourteen species, a number which, he thinks, ought to be reduced rather than augmented, for the young individuals offer sometimes in their shell characters which disappear with age.

The genera *Mitra*, *Ancillaria*, *Oliva*, *Volvaria*, and *Marginella*, are arranged by M. Rang under the family of *Enroulés*, in company with *Terebra*, *Cypræa*, and *Ocula.*

Mr. Broderip subdivides the genus *Voluta* of Lamarck into *Cymba* (*Cymbium* having been used by Gualtieri to designate the *Argonautæ* long previous to De Montfort's application of the word to a section of Volutes), *Melo*, and *Voluta.* *Cymba* has been also used by MM. Quoy and Gaimard as the name for a genus of naked Mollusks. Mr. Broderip notices Lamarck's assertion that it does not appear that any of the *Volutæ* are provided with an epidermis, and observes that a careful collection of those testaceans (now in the British Museum) has enabled him to state his belief that few if any of the species of *Cymba*, *Melo*, or *Voluta* are entirely without it. The species of *Cymba* have not only this 'drap marin,' but also the additional protection of a glaze, or vitreous pellicle, secreted by the animal, and more or less extended over the shell. This last is increased as the animal advances in age; and in some species, *Cymbæ proboscidalis*, *porcina*, *rubiginosa*, &c., forms a complete surtout, which, in old specimens, has such an appearance as has led more than one uninitiated spectator to inquire whether a thick coating of enamel had not been poured over the shell. (Sowerby's *Genera*, *Species Conchyliorum.*)

Mr. Swainson considers the *Volutidæ* to be one of the most interesting and beautiful families of the spiral *Testacea*, whether in regard to the elegance of the shells themselves, or as exhibiting a principle of variation in their structure hardly to be excelled. He remarks that our knowledge of the animals has been much increased by the French zoologists, and the drawings of Guilding. To generalise these discoveries so as to assign some undeviating character to the whole is, he says, almost impossible. The only peculiarity, he observes, appears to be the absence of any operculum :* in the majority, he adds, the eyes are sessile, placed at the base of two short tentacula, and as much developed in the typical volutes as they are in the *Strombidæ;* the mouth is probosciform and extensile; and the foot, in the typical group, of enormous size.

'The shells, however,' continues Mr. Swainson, 'present us with more tangible characters. The base is never prolonged; although in some Mitres (*Tiara*) it is contracted: in all others it is truncated, as in the *Buccininæ*, and deeply notched. The truncated base at once separates this family from the *Turbinellinæ*, as there is no instance of a volute with an elongated channel. The plaits upon the pillar, again, are always at the base—not in the middle only—of the aperture; although in the aberrant groups of *Oliva*, *Ancillaria*, and *Marginella* they assume peculiar modifications. The proportion of the spire to the aperture varies in almost every genus, and is, therefore, but a subordinate character. Numerous as is this family, nearly all the species are confined to warm latitudes, particularly those of the tropics. It is hardly necessary to add that the whole are predaceous, and consequently carnivorous.'

Mr. Swainson then arranges the family into the following five primary groups :—

1. *Volutinæ*, or typical Volutes, having a short spire more or less papillary, and the lower plaits upon the pillar largest; the foot excessively large and enveloping the sides of the shell.

2. *Mitrinæ*, or Mitres, having the spire always acute, generally longer than the aperture, and the lower plaits smallest; the foot small, not dilated on the sides, and the siphon long.

3. *Olivinæ*, or Olives, cylindrical in shape; the aperture linear, and the pillar thickened and confusedly plaited.

4. *Ancillarinæ:* the aperture wide, and the base of the pillar alone thickened and striated.

5. *Marginellinæ*, or Date-shells, having plaits upon the pillar, and crenated teeth on the thickened outer lip; the foot very large, but the mantle not lobed nor reflected.

1. Volutinæ.

Genera :—1. *Voluta*, Linn. Shell large, ventricose; the spire extremely short, very obtuse, and papillary: the terminal whorls, where they exist, being smooth and unsculptured.

This genus is subdivided into five sections, viz.:

1. *Turbinelliform Type.*

Shell melon-shaped, spire very short, sometimes nearly obsolete. This consists of *Cymba* and *Melo*, Brod.

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* But see post, p. 447.

Examples, *Voluta* (*Cymba*), *Neptuni*, and *Voluta* (*Melo*), *Æthiopica*.

2. *Muriciform Type*.

Shell heavy, less ventricose, coronated with cylindrical or vaulted spines; spire more produced.

Example, *Voluta imperialis*.

3. *Strombiform Type*.

Outer lip dilated and angulated above.

Example, *Voluta scapha*.

4. *Ancilliform Type*.

Aperture very wide; spire pointed.

Example, *Voluta angulata*.

5. *Marginelliform Type*.

Shell partially polished; ventricose.

Examples, *Voluta magnifica* and *Voluta fulgetrum*.

2. *Cymbiola*, Sw. Spire more produced, but not more than half as long as the aperture; the terminal whorls regular and sculptured; plaits on the pillar four.

Examples, Type? *Voluta ancilla*; *Voluta vespertilio*; *Vol. pacifica*; *Vol. festiva?*; *Vol. mitis*; *Vol. brasiliana*.

3. *Harpula*, Sw. Spire developed as in the last, but the tip is generally more slender, and the plaits are numerous.

Examples, *Voluta vexillum*, *Vol. ebræa*, &c.

4. *Volutilithes*, Sw. Spire acutely pointed; plaits generally faint, sometimes obsolete.

Examples, *Volutilithes spinosa*, *musicalis*, *muricina*, *rarispina*, *cithara*, *bicorona*, *crenulata*, *costaria*, *lyra*.

5. *Scaphella*, Sw. Shell smooth, almost polished; outer lip thickened internally; suture enamelled; lower plaits the smallest; apex of the spire various.

Examples, *Volutæ fusiformis*, *undulata*, *volvacea*, *zebra*, *junonia*, *stromboïdes*, and *papillosa*.

II. Mitrinæ.

Genera:—*Mitra*. No internal channel or groove at the upper extremity of the aperture; outer lip curved from its two extremities; the base of the aperture not contracted, the interior always smooth; spire lengthened, acute; shell without coronating tubercles, but not polished. Representing the *Volutæ* and *Turbinellidæ*.

The following subgenera are arranged by Mr. Swainson under this genus:—

1.

Mitra, Sw.

Shell entirely smooth, or with the sutures very slightly crenated; aperture very effuse at the base.

Example, *Mitra episcopalis*, &c.

2.

Thiarella, Sw.

Shell smooth, with the whorls coronated; the body-whorl less ventricose.

Example, *Thiarella papalis*, &c.

3.

Scabricola, Sw.

Shell rough, with transverse elevated ridges and longitudinal striæ; suture not coronated; aperture effuse; outer lip crenated.

Example, *Scabricola serpentina*, &c.

4.

Nebularia, Sw.

Shell generally marked with transverse grooves; outer lip contracted above, effuse below; the margin smooth; base of the body-whorl narrowed.

Example, *Nebularia contracta*, &c.

5.

Strigatella, Sw.

Size very small; spire thick, obtuse; outer lip thickened, and often reflected in the middle; aperture smooth.

Example, *Strigatella zebra*, &c.

2. *Tiara*, Sw. Aperture narrow, linear, or of equal breadth throughout; outer lip and base of the body-whorl contracted, the former generally striated; an internal canal at the upper part of the aperture; shell (typically) turreted, and equally fusiform; representing the *Muricidæ* and *Cymbiola*.

The following subgenera come under this genus in Mr. Swainson's arrangement:—

1.

Tiara, Sw.

Shell turreted, fusiform, costated, and semi-coronated; spire and aperture of equal length; internal striæ slight or obsolete.

Example, *Tiara virgo*, &c.

2.

Costellaria, Sw.

Unequally fusiform; the spire longer than the aperture; body-whorl slightly ventricose, but suddenly contracted near the base; internal striæ distinct; whorls convex, rarely angulated; the ribs reaching to the suture.

Example, *Costellaria rigida*.

3.

Callithea, Sw.

Spire and aperture of nearly equal length; internal channel nearly obsolete; shell with longitudinal linear ribs, crossed with transverse striæ and bands; base contracted.

Example, *Callithea sanguisuga*, &c.

4.

Cancilla, Sw.

General shape of the last; but the whorls crossed by transverse linear ribs or elevated ridges; internal canal wanting; plaits very oblique; form slender; outer lip thin.

Example, *Cancilla isabella*, &c.

5.

Pusia, Sw.

Size very small; spire thick, obtuse; outer lip thickened, and often reflected; aperture striated, with an internal canal.

Example, *Pusia microzonis*.

3. *Mitreola*, Sw. Small; unequally fusiform; the base obtuse; inner lip, typically, thickened, inflected, and either toothed or tuberculated; plaits on the pillar distinct, the inferior largest; tip of the spire sometimes papillary; aperture without either striæ or groove.

Example, *Mitreola monodonta*.

4. *Conœlix*, Sw. Small; cylindrical or conic; spire generally short and thick; plaits on the pillar numerous; exterior often decussated.

Example, *Conœlix conulus*.

5. *Mitrella*, Sw. Rather small; olive-shaped; unequally fusiform; always smooth and polished, and sometimes covered with an epidermis; base obtuse and effuse; spire nearly or quite equal to the aperture; plaits of the pillar few, oblique, and extending beyond the aperture, which is smooth internally.

Example, *Mitrella bicolor*, &c.

III. Olivinæ.

Shell smooth, highly polished; spire very short; the suture channelled; inner lip much thickened; plaits numerous, crowded, extending, in the typical genus, the whole length of the aperture.

1. *Lamprodoma*, Sw. Mitriform; spire produced, conic; resembling *Mitrella* in shape, but the suture is channelled; the aperture effuse at the base, contracted above; lower half of the pillar with 6-7 plaits.

Example, *Lamprodoma volutella*.

2. *Oliva*. Cylindrical; spire very short, pointed; pillar with numerous slender plaits; aperture narrow, the base not effuse.

Example, *Oliva maura*.

3. *Scaphula*, Sw. Spire very short, thick, obtuse, and not defined; aperture very wide, with only two or three oblique plaits at the base.

Example, *Scaphula patula*.

4. *Hiatula*, Sw. General shape of *Oliva*, but the upper part of the pillar is not thickened; the lower turned, and marked with a few oblique plaits; the aperture wide, the base effuse.

Example, *Hiatula Lamarckii*, &c.

5. *Olivella*, Sw. Oliviform; spire (typically) rather produced; the tip acute; inner lip not thickened; outer lip straight; base of the pillar curved inwards, and marked by two strong plaits; upper plaits obsolete, or wanting; aperture effused at the base only.

Example, *Olivella biplicata*.

Mr. Swainson observes that the union of the *Volutidæ* and *Turbinellidæ* is so intimately effected by *Olivella* *biplicata* and *Pseudoliva plumbea*, that the two plaits on the pillar of the former shell alone separate the two families.

IV.

Ancillarinæ.

Genus *Ancillaria*, Lam. Shell oliviform, highly polished; aperture very effuse; suture concealed by namel ; base with one or two strong grooves, which form little tooth at the edge of the outer lip ; inner lip wanting ; base of the pillar thick, vitreous, obliquely striated, nd turned outwards.

Mr. Swainson makes the characters of the subfamily nd the genus identical, 'as the genera have not been orked out.' For species, see Sowerby's *Species Conchyiorum.*

V.

Marginellinæ.

Genera :—1. *Volutella*, Sw. Bulliform ; ovate oblong ; pire either entirely or almost concealed ; pillar with four blique plaits at the base ; aperture not striated ; outer lip mooth, thickened ; inner lip wanting.

Example, *Volutella bullata.*

2. *Persicola*, Schum. General form of *Volutella*, but he spire always concealed ; plaits numerous, and extendg nearly over the whole of the pillar ; the aperture iated ; inner lip thickened, spreading.

Example, *Persicola avellana.*

3. *Gibberula*, Sw. Suboval ; spire slightly prominent ; p of the outer lip dilated and gibbous ; base of the inner p with plaits ; inner lip broad, spreading.

Example, *Gibberula zonata.*

4. *Marginella*, Lam. Oval ; spire slightly prominent ; nner lip very much developed, and forming a tumid rim ll round the aperture.

Example, *Marginella lactea.*

5. *Glabella*, Sw. Volutiform ; the spire more or less onic, and well developed ; pillar with basal plaits ; inner ip obsolete ; outer lip thick, toothed, or crenated ; rarely mooth.

Example, *Glabella ruffina.*

The characters above given are Mr. Swainson's ; and he laces the *Volutidæ* between the *Strombidæ* and the *Cypræidæ.* (*Malacology.*)

Mr. J. E. Gray observes that the family of Volutes have recurved siphon, and only a nick in the front of the nouth of the shell, like some of the other genera (*Harpa*, &c.) ; but the front of the pillar of the shell is regularly nd obliquely plaited. The foot of the animal is very large, artly hiding the shell, and generally deeply nicked on ach side in front. In general the shell is covered with a listinct periostraca (epidermis of old authors), as in *Mitra*, *Voluta*, and *Musica* ; but in a few, as *Cymbium* (*Cymba*, Brod.), the animal, when any sand or other matter gets etween the shell and the upper surface of the foot, ecretes a quantity of shelly matter, and covers the adventitious substance with a glassy coat, so as to prevent the xtraneous particles from irritating it. In some, Mr. Gray emarks, as in *Voluta angulata*, one of the sides, and in thers, as in *Marginella*, both sides of the mantle are proluced and reflected over the back of the shell, and the helly matter secreted by these parts covers the outer surace of the shell with a polished coat like the cowries. Only a few species, as *Voluta musica*, and some of the maller *Mitres*, are provided with a horny operculum, which s entirely deficient in the other kinds. The animals of he genus *Cymbium* are, he says, ovoviviparous ; the shell of the newly-born animal is very large, and the apex of he spire of many of these shells is very irregularly wisted. The *Vulpeculæ*, according to Mr. Gray, differ om *Mitra* in the outer lip being striated within. The *Imbricariæ* are obconic shells, with a linear mouth and nany plaits on the pillar. The *Hyalinæ*, he remarks in onclusion, differ from the *Marginellæ* in the spire being hort and the outer lip only slightly thickened ; and the *Persiculæ* in the outer lip not being thickened externally, nd in the inner lip being cross-grooved.

The *Volutidæ* form the fourth family of Mr. J. E. Gray's Zoophagous Gastropods (*Ctenobranchiata*), and are placed y him between the *Buccinidæ* and the *Cypræidæ.* nder this family Mr. Gray arranges the following

Genera :—*Cymbium* : *Volutella* : *Voluta* ; *Mitra* ; *Vulcula* ; *Turris* : *Volvaria* ; *Imbricaria* ; *Marginella* ; *Hyalina* ;* and *Persicula.* (*Synopsis Brit. Mus.*, 1842.)

We now proceed to lay before the reader some of the orms of this extensive carnivorous group, as far as the imits of this work will allow.

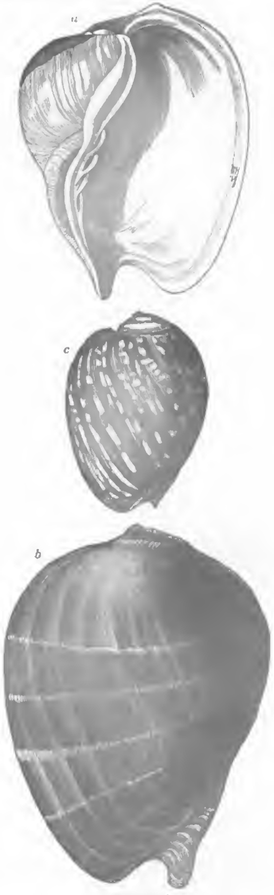
Cymba.

Example, *Cymba neptuni.*

Description.—Shell obovate, tumid, ventricose, of a brownish-red, covered with a strong brown epidermis, over which an enamel-like glaze is extended from the pillar over about a fourth part of the shell, leaving the epidermis of the back uncoated. In full-grown specimens the spire and apex are entirely concealed, and the upper border of the body-whorl, which is carinated and somewhat reflected, overhangs both, so as to form an open somewhat round concavity. Pillar four-plaited.

Locality.—African coasts.

Cymba, of which there are several species, has been found in shallow water on sands and mud.



Cymba neptuni.

a, seen from below, showing the plaits of the pillar : b, seen from above ; c, young, seen from above.

Melo.

Example, *Melo æthiopicus.*

Description.—Animal.—General form of the body indicated by that of the shell. The mantle which envelops it is in general rather delicate, except on the borders, especially on the right, where it is a little thickened, but without any trace of cirrhi or lobules. Below the anterior part a very considerable and very thick respiratory canal, at the posterior root of which is a tentacular appendage. The foot is enormous relatively to its thickness and extent; its form is oval, very convex above, without any trace of a transverse or a longitudinal furrow: it re-enters in great part into the shell by folding longitudinally, and its pedicle of insertion, or columellar fascia, has this direction; it is very thick and large, but less than in the cones. The head forms a considerable mass, flattened and bordered on its circumference by a sort of veil with thick edges, susceptible, doubtless, of great extension. The tentacles are lateral, very distant from each other, conical, rather elongated, and contractile. The eyes, remarkable for their size, are equally very distant, entirely sessile, and placed behind the tentacles: there was remarked in these organs a white envelope, probably fibrous, through which the black colour of the choroïd was observable: the orifice of the pupil was also seen; and an enormous crystalline lens, filling the whole cavity and offering an anterior projection, a little like what is to be seen in the *Sepiæ*: there seemed to be two small muscles behind. The skin becomes delicate in front of the eye, and forms a rather convex transparent cornea. Below the head issues a sort of proboscis very thick, subcylindrical, with a small aperture and vertically slit. The branchial cavity is, as the form of the shell indicates, extremely extended; it occupies the whole of the last whorl: it was seen to communicate with the ambient fluid by means of a very thick muscular siphon. There were two considerable branchial combs; the right larger than the left, formed by a single row of denticles, while the latter consisted of two. Behind is the orifice of the anus, which is rather small, oval, and sessile, and placed in front of an oblique zone of great folds formed by the external projection of the depuratory organ. The individual examined was a male; and on the right side of the neck, or at the anterior part of the pedicle of the foot, the exciting organ of generation was seen in an auricular form, narrow, flattened, and directed from before backwards. (*Uranie.*)

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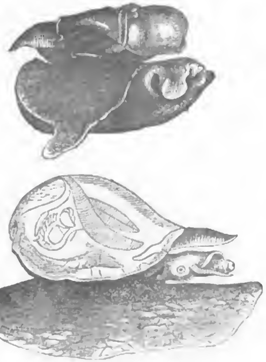
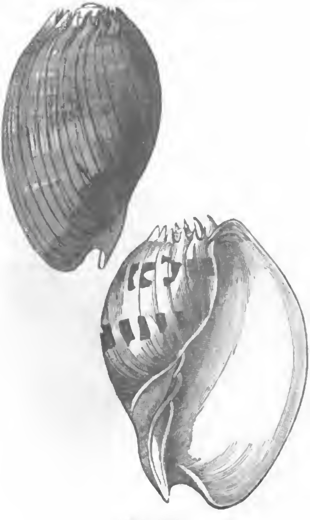
* Too near to *Hyalæa.*



Animal of Melo æthiopicus. (*Uranie.*)



Shell of Melo.

Back and front view.

Shell obovate, ventricose, of an orange-cinnamon colour; the spire coroneted with thick-set short-vaulted spines; pillar 4-plaited.

Locality.—The African Ocean, Lamarck. East Indian seas. The specimen from which the description in the *Zoologie* of the *Uranie* was taken, is stated to have been found at Shark's Bay, Australia.

Melo, many species of which have been described, have been found in shallow water on sands and mud.

Voluta.

Example, *Voluta undulata.*

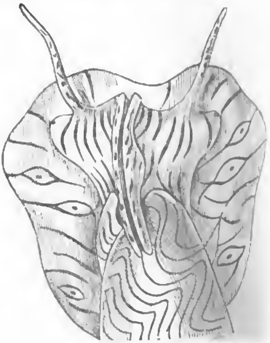
Description.—Shell ovate-fusiform, smooth, yellowish white, clouded with fulvous or purple-black spots, ornamented with numerous bay or brown longitudinal undulatingly flexuous lines; principal plaits on the pillar four, sometimes two smaller additional ones.

Locality.—Coasts of New Holland, Port Western, Bass Strait, the Island Maria, &c.

Voluta pacifica.

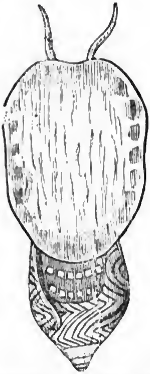
Description.—Shell ovate-fusiform, anteriorly tuberculiferous, pale yellow or flesh-colour ornamented with brown spotted bands, and bay vein-like markings; pillar four-plaited.

Locality.—New Zealand. Bay of Islands.

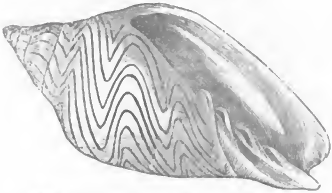


Voluta undulata. (Animal and shell.)

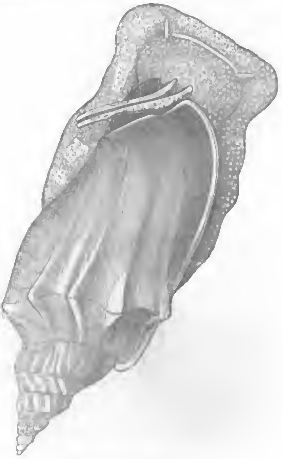
Anterior part seen from above.



Voluta undulata. (Animal and Shell.)
The whole seen from below. (*Astrolabe.*)



Shell of Voluta undulata, showing the plaits on the pillar.

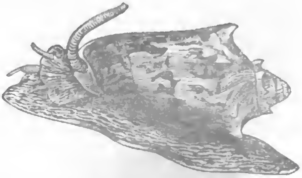


Voluta pacifica. (*Astrolabe.*)

Voluta vespertilio.

Description.—Shell turbinated, armed with strong distant acute tubercles, white, yellowish, or reddish, painted with angularly flexuous spots; spire muricated, the apex with small tubercles; lip with a sinus above; pillar four-plaited.

Locality.—Indian Seas, Amboyna, Moluccas, &c.



Voluta vespertilio. (*Astrolabe.*)

The varieties of this species are almost endless, both in colour and markings. Some are armed with strong projecting spines, some with tubercles, and others again are smooth.

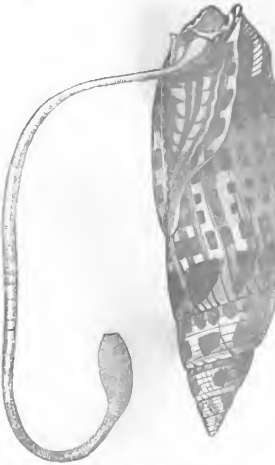
Voluta has been found at depths ranging from seven to fourteen fathoms. The species are very numerous and very beautiful. M. Deshayes gives the number as sixty-two, and notes one species, *Voluta Lamberti*, as found recent and fossil (tertiary).* This number of recent species is probably below the mark, especially when we consider that, under the name *Voluta*, M. Deshayes in all probability includes the subgenera *Cymba* and *Melo*.

Mitra.

Examples, *Mitra episcopalis.*

Description.—The *animal* has a narrow foot, compressed and channelled at its root, nearly square and slightly auriculated in front with a marginal furrow, and pointed behind. The head is very small, rounded, with two tentacles, which are scarcely a line and a half in length; the eyes sessile at their base. An enormous proboscis, which is sometimes double the length of the shell.

The respiratory siphon does not project beyond the canal; it is marked with black at the point: the rest of the animal is yellowish. The proboscis is white.



Mitra episcopalis seen from below, with its long proboscis. (*Astrolabe.*)

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* Quære, as to this identity.

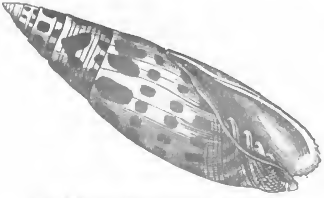
The ovary is placed on the side of the liver; the uterus is very large, attached to the rectum, which is above it; its aperture, instead of being terminal, is situated a little within. These two organs are placed, as they are ordinarily, on the right side of the branchial cavity.

The penis of the male is very small, short, and pointed.

Length of animal and shell, from two inches to six or eight.

Shell turreted, smooth, white, spotted with bright red; pillar four-plaited; outer lip denticulated at its lower part; epidermis thin.

Locality.—East Indian seas; islands of the South Sea, Tongataboo.



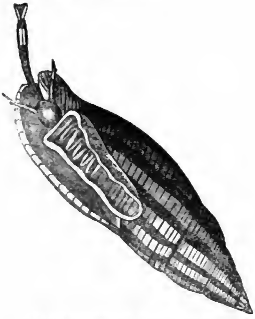
Shell of Mitra episcopalis, showing the plaits on the pillar.

Mitra adusta.

Description.—Shell fusiform turreted, albido-lutescent, ornamented with longitudinal rufous brown spots; the striæ transverse, impressed, rather remote, and dotted; the sutures crenulate; the pillar five-plaited.

Locality.—Timor, Vanikoro.

There are at least two varieties.

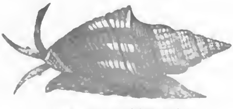


Mitra adusta seen from below. (*Astrolabe.*)

Mitra corrugata.

Description.—Shell ovate-fusiform, longitudinally plicated, transversely rugous, whitish; bands and belts brown; whorls angulated above; the last whorls with a submuricated angle; pillar four-plaited.

Locality.—Indian Ocean, New Guinea.



Mitra corrugata. (*Astrolabe.*)

Mitra has been found at depths varying from the surface to seventeen fathoms, on reefs, sandy mud, and sands. The species are all inhabitants of warm countries. The number of recent species recorded by M. Deshayes, in his tables, is one hundred and twelve; and of these *Mitræ lutescens* and *cornea* are stated to have been found both recent and fossil (tertiary).

Oliva.

Animal involved, compressed, with a small head terminated by a proboscis; tentacles approximated, enlarged at their base and subulate at their extremity, carrying the eyes on small convexities about their middle part externally; foot very large, oblong, and slit transversely anteriorly; mantle with a single lateral lobe covering the shell in great part, with two tongue-like processes at the side of the branchial opening, and forming in front a very elongated siphon; a single branchial pectination; male organ very voluminous, on the anterior part of the right side.

Operculum horny, elongated, very small, with a marginal apex.

M. Rang, whose descriptions we have selected, observes that this genus forms a part of a small number of those which prove that the operculum cannot be taken as a character to divide the PECTINIBRANCHIATA into *Pomastomes* and *Apomastomes;* for if, on account of its presence, the olives should be arranged in the first of these divisions, the result would be to separate at a distance from each other mollusks which it would be impossible to separate, not only on account of their organization, but also on account of the general characters of their shell. Notwithstanding the absence of an operculum, it is necessary to keep the Harp-shells near the *Buccina*, and Litiopa near *Phasianella.*

M. Rang further states that the genus *Oliva* is one of the richest in the colour and brilliancy of the shell and variety of species; and he refers to the beautiful collection of M. Duclos, who had made the genus his particular study. In that collection there were about forty new species; but, on the other hand, some of Lamarck's had been eliminated by M. Duclos, in consequence of their having been established on varieties dependent on age. M. Duclos divided the species into four groups:—

1. The Ancilloïd.

These bear some relationship to *Ancillaria* in form, and their columellar plaits are twisted.

Example, *Oliva hiatula*, &c.

2. The Cylindroïd.

Cylindrical, the spire very pointed, with very numerous plaits on the pillar occupying nearly the whole of the left lip.

Example, *Oliva subulata*, &c.

3. The Glandiform.

Globular, ventricose, with a very short spire.

Example, *Oliva porphyria.*

4. The Volutellæ.

Spire mucronate, and the canal obliterated towards the commencement of the last whorl.

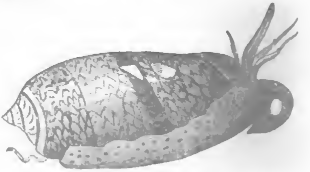
Example, *Oliva brasiliana*, &c.

M. Rang remarks that the last species of this group, *Oliva auricularia*, leads to the Volutes by its mucronate spire, the development of the right lip, and the almost total absence of columellar plaits.

Examples, *Oliva textilina.*

Description.—Shell cinereous white, subreticulated with flexuous dotted lines, with two brown bands inscribed as it were with characters: the callus of the canal prominent.

Locality.—The ocean of the Antilles, according to Lamarck. New Guinea, according to the voyage of the *Astrolabe.*

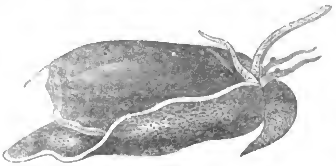


Oliva textilina. (*Astrolabe.*)

Oliva maura.

Description.—Shell cylindrical, the apex retuse, black; lip subplicate externally; aperture white.

Locality.—East Indian Ocean; a yellowish variety, New Holland, according to Lamarck. Amboyna, *Astrolabe.*

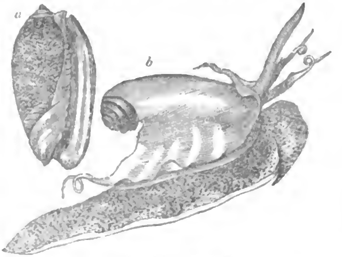


Oliva maura. (*Astrolabe.*)

Oliva sanguinolenta.

Description.—Shell cylindrical, very delicately reticulated, with rufous brown small lines, girt with two brown zones; the pillar orange-red.

Locality.—East Indian Ocean. Coast of Timor.



Oliva sanguinolenta. (*Astrolabe.*)

a, Shell seen from below; *b*, animal out of the shell, shown as when creeping on its large foot.

Oliva has been found at depths varying from the surface to twelve fathoms, on mud, sandy-mud, coarse sand, &c. The species are fond of flesh, but they only suck the juices; and at the Mauritius they are taken with that bait in the following manner, according to Lieut. Harford, who was for some time there, brought home some very fine Mauritian shells, and gave the information to Mr. Broderip. The fishery was carried on by means of a line made to run parallel with the bottom of the sea, to which line small nooses, each containing a piece of the arms of a cuttle-fish (*Sepia*), were appended so that the bait touched the bottom. To one end of the line a chain-shot was attached by way of mooring; and over it were a buoy and a flag. The other end of the line swung with the tide, and that end was also marked by a buoy and a small flag. The sport was carried on in deep water over sand-banks, and the best times were the morning and the evening. The apparatus was occasionally cautiously drawn up and the Olives which were found adhering to the bait were taken into the boat in which the fishermen were.

The number of species recorded by M. Deshayes in his tables is seventy-eight recent, and, of these, *Olivæ hiatula* and *flammulata* are stated to be found both living and fossil (tertiary).

The number of recent species of *Marginella* (which has been found at depths varying from the surface to nine fathoms, on sand and sandy mud), recorded by M. Deshayes in his tables, is forty-eight; and of these, *Marginellæ cypræola*, *miliacea*, and *monilis* are stated to be found both living and fossil (tertiary).

Only one recent species of *Volvaria* is recorded by that author.

Conœlix has been found on coral reefs.

Nine recent species of *Ancillaria*, which has been dredged up in moderately deep water at New Zealand, are recorded by M. Deshayes.

Columbella is described and figured in the article Siphonostomata, Vol. xxii., p. 53.

Fossil Volutidæ.

The number of Fossil *Volutæ* from the tertiary beds, given by M. Deshayes in his tables, is thirty-two. Mr. Broderip has described and figured one from St. Peter's Mountain, near Maastricht, in the third volume of the *Zoological Journal;* and Dr. Mantell notices a species (*luctator*) from the blue clay of Bracklesham and the arenaceous limestone or sandstone of Bognor. Mr. Lee enumerates seven species from the tertiary of Alabama.

The number of fossil *Mitræ* (tertiary) stated in the tables of M. Deshayes is sixty-six; of *Oliva*, thirteen; of *Ancillaria*, nine; of *Marginella*, seventeen; of *Volvaria*, two; and of *Columbella*, four.

Mr. Lea records from the tertiary of Alabama (Claiborne beds) five species of *Mitra*; eight of *Marginella;* and six of *Oliva*.

VOLUTILITHES (Fossil). [Volutidæ.]

VOLVA, in Botany, is the external membranous or fleshy covering which encloses the stipes and pileus of the young state of many of the order Fungi. As the parts of the plant grow, they burst through this covering, and it is generally found in a torn state at the base of the stipes. The most perfect examples of the volva are seen in the *Phallus impudicus* and the *Agaricus volvaceus.*

VOLVA'RIA. [Volutidæ.]

VOLVIC. [Puy de Dôme.]

VON VISIN. [Visin, Von.]

VONDEL, JOOST VON DEN, the great national poet of Holland, was born Nov. 17th, 1587, at Cologne, to which city his parents had retired from Antwerp, in order to avoid the persecution to which, being Anabaptists, they were exposed from the religious severity and jealousy of the Austrian-Spanish government. As soon however as the republic of the United Provinces was established, the family removed to Amsterdam, where Vondel continued to reside during his very long life. The education he received from his parents did not extend beyond the ordinary acquirement of reading and writing; for his father was only a tradesman, as he was afterwards himself, dealing in hosiery as his ostensible business, though making poetry his serious occupation. How he contrived to reconcile literary study with business so well as he did we are not informed; but there is reason for supposing that his attention to the first rather checked his success in the latter, since he seems to have been far from prosperous in trade as a hosier. For poetry he is said to have evinced a taste very early, and even to have given evidence of his poetic talent when he was no more than thirteen. It was not however until he had reached double that age that he began to study Latin. Not only was his proficiency in the language rapid, but a decided improvement, both as to style and ideas, it is said, soon began to manifest itself in his compositions; yet in proportion as he caught the tone as well as the spirit of the antients, he probably lost originality of invention and freshness of feeling. His tragedies, which form so considerable a portion and so important a class of his productions, show him to have possessed far higher genius as a lyric poet than as a dramatist; for they owe their chief attraction to the 'Reien,' or chorusses, with which they are interspersed, and many of which are most splendid lyrical effusions; it is these, in fact, which give us the loftiest flights of Vondel's genius, and which constitute his chief attractions for modern readers. A selection of them was made by De Vries, who published it in 1820. Among the more celebrated of his dramatic poems are his 'Palamedes,' 'Gijsbrecht von Amstel,' and 'Lucifer.' The first of these, which was a direct allusion to the fate of the grand-pensionary Barneveldt [Barneveldt], obtained for its author both political and literary distinction; for though not published till after Prince Maurice's death, in 1625, it was prosecuted by those in power as treasonable, and as libellous on the memory of that prince, and it was only with great difficulty that Vondel escaped severer punishment than a fine of 300 guldens. On the other hand it obtained for him the highest renown both as a patriot and a poet, and passed through thirty editions in the course of a few years. The 'Gijsbrecht,' which was written by him for the opening of the new theatre at Amsterdam, in 1637, is justly considered one of his masterpieces, and is also, of all his dramas, that which is most national in its subject. That however which possesses for us as Englishmen almost the charm of nationality, is the 'Lucifer,' for it may be considered the precursor of our 'Paradise Lost,' which it anticipated by fourteen years; consequently for its Miltonic grandeur and inspiration it is not at all indebted to the work of the English bard, nor is there reason to suppose that Milton kindled his flame at that of his illustrious contemporary. Milton and Vondel were kindred spirits.

To enumerate here chronologically all the productions of Vondel, not in the drama alone, but in almost every other species of poetical composition, would be useless. We will therefore specify one performance, which, had he completed it, might alone have secured for him the reputation of an epic poet; namely, a poem of which Constantine the Great was the hero, and which he began in 1632; but the death of his wife shortly afterwards caused him to abandon the subject, and, lest he should be tempted to resume it, he destroyed the manuscript. The loss of his wife was indeed a severe blow to him, for it was she who had chiefly attended to the concerns of their business. From that time his circumstances grew worse, and his embarrassments were afterwards so much increased by the conduct of a spendthrift son, that at the age of seventy-two he was glad to obtain a situation with a small salary in a bank at Amsterdam. We compassionate the reverses of the author of 'Waverley,' yet what were they in comparison with the ten years of drudgery to which the author of 'Lucifer' was doomed in keeping accounts? Even there however neither his energy nor his genius deserted him, for it was at this period that he composed, besides several other things, his 'Jephtha,' one of the best and the most regular of his tragedies. At length, in 1668, he was permitted to retire, retaining his salary as a pension for life; and, notwithstanding his then advanced age, he lived to enjoy it many years, for he did not die until February 5, 1679, when he had attained a length of days that entitles him to be classed among the patriarchs of literature and art.

(Eichhorn, *Geschichte der Litteratur;* Von Kampen, *Geschiedenis der Letteren.*)

VONO'NES. [PARTHIA.]

VOORN is an island of the province of South Holland, in the kingdom of the Netherlands, between the mouths of the Maas, and is divided into East and West Voorn; it is about twenty miles long and four broad, and produces a considerable quantity of corn. The town and fortress of Briel are on this island. [BRIEL.]

(Stein; Hassel; Cannabich.)

VOPISCUS, FLA'VIUS. [AUGUSTA HISTORIA.]

VORONETZ, or WORONESCH, a government in the interior of Russia in Europe, is situated between 48° 35′ and 52° 50′ N. lat. and between 37° 45′ and 43° E. long. It is bounded on the north by Tambow, on the north-east by Saratow, on the east and south-east by the country of the Don Cossacks, on the south-west by Ekaterinoslaw, and on the west by Slobodsk-Ukraine. Its area is 29,400 square miles, and it is divided into thirteen circles.

The face of the country is an undulating plain, without picturesque or interesting scenery, traversed by low ridges and chalk hills. In most of the circles there are woods or groups of trees; in several, extensive commons, but only a few morasses and bogs. The soil consists partly of clay, partly of sand, for the most part covered with a pretty thick layer of vegetable mould, which is so fertile that it requires no manure, but only a periodical fallow.

The principal river is the Don, which comes from Tambow, and, traversing the government from north to south, receives most of the other rivers, such as the Voronetz, which is navigable by large barges; the Sosna, the Ikoretz, the Donez, and some others. There are no great lakes, morasses, or bogs. The former do not abound in fish; their course in the summer is slow, and in the larger ones there are many sandy islands. The climate, as may be supposed, under this latitude is temperate and healthy, and the inhabitants live to a great age, and the productions of the temperate climates flourish: the rivers do not freeze till December, and thaw in the beginning of March.

Agriculture, Manufactures, and Trade.—Voronetz is one of the corn provinces of the empire; the fertile soil requires little or no manure; it is only suffered to lie fallow one year in five or six. The farmers grow wheat of different kinds, barley, oats, buckwheat, millet, and maize; the last however only in gardens: poppies, lentils, peas, flax and hemp are likewise grown in the fields. General failures of the crops are very rare, local failures not frequent, but on the whole agricultural operations are conducted in a very negligent manner. Horticulture is very carefully attended to: the gardens produce all the kinds of vegetables that are grown in Germany. Hops, but only in small quantities, are grown in most gardens. The most common fruits are cherries and some plums; apples and pears are more scarce. Vines grow only in sheltered situations, but the grape does not ripen, except in the warmer years. The forests afford on the whole sufficient timber for the use of the inhabitants, and some firewood for exportation, but they are very nearly thinned. Pines are rare; there are remarkably fine oaks. The rich pastures on the banks of the rivers and the extensive commons are favourable to the breeding of cattle, which is a very general occupation of the inhabitants. There are more numerous flocks of sheep and herds of swine than in the more northern provinces. Oxen suffice only for the home consumption: there are many small studs of horses of the Russian race. The most common domestic poultry are geese and barn-door fowls: bees are very generally kept: the chace and fishery are quite unimportant. The minerals are, iron (but no other metal), chalk, limestone, freestone, and saltpetre.

Hassel, in 1821, says that the manufactures of the province were quite unimportant, and did not supply one article for exportation; but Schnitzler, in 1836, says that very great progress had been made in this respect, and doubtless further improvement has since taken place. The exports are the natural productions of the country, corn, cattle, hides, timber, bristles, some coarse cloth, saltpetre, honey, and wax. The chief commercial cities are Voronetz and Ostrogohsk; but there is too great want of good water-carriage, because the Don is navigable only in the spring, when the water is high, and the Donez merely touches the frontier, and has not one town on its banks.

The population of this government is 1,508,000. The inhabitants are in the northern part Great Russians, and in the southern Little Russians. Among the latter are included the Cossacks, or Tscherkassians, as they are here called, after their ancient capital; there are also some gypsies, and in the neighbourhood of Ostrogohsk a German colony. With respect to public education, Voronetz is under the university of Moscow. The number of scholars in the parish schools is about 1500, and rather more than that number in the ecclesiastical schools. There is also a military school for 400 cadets at Voronetz.

VORONETZ, the capital of the government to which it gives its name, the residence of the governor and of the bishop of Voronetz, is situated in 51° 40′ N. lat. and 3[illegible] E. long., on the river Voronetz, which falls into the Don two miles below the city. Voronetz is built on a very steep rock, 'to which,' says Dr. Clarke, 'nature has given the appearance of a rampart, so that viewed from the river below it looks like a prodigious fortification raised by art.' It is one of the oldest cities in the empire, and is mentioned in 1177. Peter the Great had a dockyard here for building ships, with which he intended to descend the Don to the sea. He often resided here, and built himself a palace, no vestige of which now remains.

The city consists of three parts, the upper town, the lower town, and the suburbs. The upper town contains the residence of the governor and the public offices, the bishop's palace, the cathedral, the bazaar, and the town-hall. In the three parts there are 18 stone churches, 2 convents, a poor-house, a gymnasium, an ecclesiastical seminary, an arsenal, and several schools. This is the statement of Hassel in 1821, and is copied by Schnitzler in 1835, but considering the very great increase in the population, it is highly probable that the number of the public buildings must be now greater. Stein, in 1821, makes the population 12,000; Hassel, in 1821, doubts whether it amounts to 15,000; but the official accounts in 1841 make it no less than 43,800. It may be observed that Dr. Clarke, speaking of Voronetz, says, 'It has become a very handsome city; it is remarkable for its commerce, the Don affording it an easy communication with the Black Sea. The situation of Voronetz would render it fit to become a great capital:' and again, 'New houses are building in all parts of it; the suburbs appear so extensive that it is difficult to foresee how far the city may yet increase.' The streets are very broad, but not yet paved. The manufactures are, cloth for the army, leather, soap, and vitriol. There are some breweries and brandy-distilleries. The merchants of Voronetz trade with all parts of the empire.

Ostrogohsk, a small commercial town, with several churches, has 4000 inhabitants, who carry on an extensive trade; the three annual fairs are visited by merchants from the most distant parts, and even by Greeks, who bring many Turkish goods. About 10 miles off there is a small colony of Germans, whose chief occupation is agriculture. The other towns of the government are of small importance.

(Hassel, *Das Russische Reich in Europa*; Stein, *Geog. Lexicon*; Schnitzler, *La Russie, la Finlande, et la Pologne*; Dr. E. Clarke, *Travels in Russia*.)

VORONIKHIN, ANDREI NIKOPHOROVITCH, a Russian architect, born in 1760, among the peasantry of Count Alexander Stroganov, who, having heard of his talent for drawing, sent him, in 1777, to Moscow in order to be properly educated as an artist, and he there received some instruction from Bazhenov and Kazakov, two eminent architects. He was then sent to travel with his patron's son, Count Paul Stroganov, and after visiting the southern provinces of Russia, Germany, and Switzerland, resided for some time at Paris, diligently profiting by the opportunities there afforded of pursuing his architectural studies. In 1790 he returned to St. Petersburg, where Stroganov's protection soon brought him into notice, and obtained for him employment. Mere employment however, without more than ordinary opportunities, can hardly lead to architectural fame; it was therefore fortunate for Voronikhin that such opportunity was given him in the erection of what is still one of the finest monuments of the northern capital of Russia. It was in 1800 that the emperor Paul conceived the idea of building a magnificent cathedral in the 'Nevskii Prospect,' to be dedicated to 'Our Lady of Kazan;' and Voronikhin, who was then professor at the Academy of Arts, was appointed architect. In the following year the first stone was laid by the emperor Alexander, and the edifice was completed and solemnly consecrated in September, 1811. Criticism has not been sparing of its remarks—some of them exceedingly captious—on this piece of architecture: for no other reason than because the principal façade is extended by a semicircular colonnade, it has been called a copy of St. Peter's at Rome on a reduced scale, whereas there is no one point of similarity between the two buildings in any other respect. To note but one or two trifling differences: the front of St. Peter's has no prostyle or portico, and the pediment is a mere sham one of most insignificant proportions; the colonnades again are there neither on the same scale nor of the same order as the church itself, nor are they combined with it. What degree of resemblance there is even thus far between the two designs may therefore easily be judged by referring to PORTICO, fig. 8, which represents the plan of the polystyle prostyle of the Kazan church with a portion of the lateral colonnades.

Although Voronikhin is said to have erected a great many other buildings, both public and private, we have no sufficient account nor even a complete list of them; among them however are said to be the colonnade in the gardens at Peterhof, the terraces, &c. at Strelna, and several villas at Gatchina and Pavlovsky. Voronikhin died rather suddenly, Feb. 21 (March 5), 1814.

(Nestor Kukolnik, in *Entziklopeditsheskii Leksikon*.)

VORST, or, Latinized, VORSTIUS, CONRAD, a celebrated German divine, was born at Cologne on the 19th of July, 1569. At the time of his birth his family belonged to the Roman Catholic church, but some years after his father, with his whole family, consisting of his wife and ten children, secretly embraced the Protestant religion. After having received his preparatory education in a village near Cologne, Conrad was sent to Düsseldorf, where he studied from 1583 till 1586. He continued his studies at Cologne, but was prevented taking his degree, partly because he could not subscribe the decisions of the Council of Trent, and partly because his father's means were not sufficient to allow his son to go to a Protestant university. For a time therefore his learned pursuits were abandoned, and Vorstius began to prepare himself for a mercantile life. What enabled him afterwards to continue his studies is not said, but in 1589 he went to Herborn, where he devoted himself with great success to the study of theology under the famous Piscator. During his stay there he gained his living principally by giving private instruction, and in 1593 he went with some of his pupils to Heidelberg, where he was honoured the year after with the degree of Doctor of Divinity. In 1595 he visited the universities of Switzerland, where he took a part in some of the theological controversies which were then carried on there. For some time he delivered lectures at Geneva, which were so well received, that the regular professorship of divinity was offered to him in that university. But about this time Count Arnold of Bentheim had founded a great school of divinity at Steinfurt, and he invited Vorstius to a professorship, which he accepted. He soon acquired a great reputation, and received very honourable invitations from several universities; but all offers were refused, partly because his own family did not wish him to go to any great distance from them, and partly because Count Arnold was unwilling to part with him. The readiness with which Vorstius complied with the count's request was afterwards very honourably rewarded, for Vorstius was raised to the highest ecclesiastical office in the count's dominions. About the year 1598 a report got abroad that Vorstius had expressed himself in favour of the doctrines of Socinus. The count hearing of it, began to be alarmed, and requested Vorstius to go to Heidelberg and clear himself of the charge before the faculty, which had conferred upon him the degree of Doctor of Divinity. Vorstius succeeded in clearing himself of Socinianism, but was obliged to own that he had used expressions which might seem to justify the charge. After having expressed his regret, and solemnly declared his abhorrence of the opinions of Socinus, he returned to Steinfurt. Although he had thus outwardly cleared himself, the suspicion which had once been raised could not be allayed. The matter was brought to a crisis when, in 1610, he received an invitation to the professorship of theology at Leyden, which had become vacant by the death of Arminius. Vorstius, after some consideration, accepted the offer, although he was well aware of the difficulties which he would have to encounter; but he was very much pressed by the followers of Arminius, and he also hoped to find a wider field for the free exercise of his powers than in the small principality of Bentheim. He went to Leyden provided with the most satisfactory testimonials respecting his orthodoxy and his conduct; but his appointment alarmed the Calvinistic party at Leyden and in Holland generally. They protested most vehemently against the appointment, and even solicited the interference of foreign universities, and of James I., king of England. The work of Vorstius on which their fears and accusations were chiefly founded was a collection of dissertations which he had published at Steinfurt, in 1610, under the title 'De Deo, seu Disputationes decem de Natura et Attributis Dei, diverso tempore Steinfurti habitae.' This book was attacked more fiercely than even the Koran had been by any Christian writer. King James I., after having read the book, found it full of heresies, and had it publicly burnt at Oxford, Cambridge, and London; and he recommended the States of Holland not to tolerate such a heretic within their territory. The States instituted an investigation, and as the contest grew hotter every day, Vorstius was obliged to quit Holland and wait for the final decision in another country. The king of England in the mean time wrote a tract against the unfortunate professor, declared that burning was much too mild a punishment for him, and threatened to cause all orthodox Protestants to unite their strength against the Arminian heresies. The synod of Dortrecht at length, in 1619, brought the matter to a close; and it is said to have been chiefly owing to the influence of the English deputies at this synod that Vorstius was declared unworthy of the office to which he had been appointed, and exiled from Holland for ever. For two years Vorstius and his family lived in concealment, and his life was threatened more than once by persons who thought it a religious duty to kill a man who was capable of doing so much injury to the Christian religion. At last the duke of Holstein offered Vorstius and the scattered remnants of the Arminians a place of refuge in his own duchy, and assigned to them a tract of land, on which they built the town of Friedrichstadt. Vorstius arrived in Holstein in the summer of 1622, but he was taken ill soon after, and died on the 29th of September of the same year at Tönningen. His body was carried to Friedrichstadt, and buried honourably.

Vorstius was a pious and devout man. There is no evidence whatever that he had adopted the Arminian doctrines previous to his going to Leyden. Bayle justly remarks that the persecutions of his enemies for errors of which he was not guilty drove him into them; for that he was an Arminian during the last period of his life is attested by his own evidence. Vorstius was a man of considerable learning, great independence of mind, and of sound judgment. He wrote a great number of works, most of which are of a controversial nature, and directed partly against the doctrines of the Church of Rome, and partly against his opponents among the Protestants. Some few are of a devotional and religious character. Most of them are written in Latin, some in German, and some in Dutch. Lists of them are given in Jöcher's 'Allgemeines Gelehrten-Lexicon,' and in Bayle's 'Dictionnaire Historique et Critique.'

(Sandius, *Bibliotheca Antitrinitariorum;* Gualterus, *Oratio in obitum Conradi Vorstii.*)

VORTEX. The theory of Descartes on the formation and mechanical laws of the universe was first published in 1637, in his 'Principia Philosophiæ.' One part of this theory, namely, the hypothesis of vortices, is almost the only one which generally passes by the name of Des Cartes. But it should be remembered that this is only a part, and a small part, of the system which rendered the Newtonian view of astronomy for a long time unacceptable to the continental philosophers. The metaphysics, the mechanics, and the astronomy, of the once celebrated Cartesian system, combined as they were by one writer, and that writer a most skilful and elegant proposer of his own views, are to be looked at together as that which Newton's philosophy had to meet. Perhaps we should not be wrong in saying that the impossibility of a vacuum, maintained by Des Cartes as self-evident, was a greater obstacle in the way of the theory of gravitation, with which it seemed incompatible, than the theory of vortices, which Des Cartes proposed as an hypothesis, and which did not necessarily contradict Newton's deductions. We shall here present a brief sketch of the system, so far as is necessary, from the third book of the 'Principia Philosophiæ:' this sketch is, as far as it goes, only a table of contents of the work itself, and Descartes may be supposed to be the speaker. Such comments as we add are in parentheses.

The human imagination must not either limit the power of God or unduly exalt its own: and it must not suppose that all things were made for man's use only. In enumerating phenomena Descartes prefers rather to deduce them from causes than to make them serve in finding causes. He then describes the relative distances of the planets, and asserts the immensity of the distances of the fixed stars. After the usual statements relative to the light of the sun, planets, and fixed stars, he rejects the Ptolemaic hypothesis, and observes that those of Copernicus and Tycho Brahé differ very little as hypotheses, and explain phenomena in the same manner. He says also that the latter, though he denies the motion of the earth, yet in reality gives it more motion than the former (with Descartes, relative motion was a most absolute idea); whence, differing from both, he will, with more truth than Tycho, and more care than Copernicus, take away the motion of the earth. To this end he proposes an hypothesis, which will be very fit to explain phenomena; but only as an hypothesis, not as an absolute truth. The fixed stars are exceedingly distant; the sun consists of a fluid and mobile matter, which would carry the circumjacent parts of the heavens with it, but which does not change its place in the heavens: the solar matter does not need aliment. Each one of the fixed stars has an immense space about it, in which there is no other fixed star. The heavens are filled with fluid matter, as astronomers commonly suppose, because they do not see how the phenomena of the planets can be otherwise explained. Each* of the heavens carries with it all bodies therein contained. The earth and every planet is at rest in its heaven, though it may be carried with that heaven: the earth therefore, or any one planet, may be said not to move, but all the others must be said to move. The whole heaven of the sun is moved round it in the manner of a whirlpool, 'in modum cujusdam vorticis,' the more distant parts moving more slowly than the nearer; and the planets are carried round with this heaven. And as in the larger whirlpool are sometimes seen smaller ones, which are carried round in the larger; so each planet is the centre of a smaller vortex, in which its satellites are carried round their primary. The sun and planets are carried round their axes by the motion of their vortices (the inclinations of the planetary orbits to the ecliptic have an obvious explanation: the inequalities in longitude are mentioned without explanation). It can hardly be that an hypothesis which thus explains phenomena can be false: to say this would seem to be an imputation upon the Deity, namely, the supposition that he made us so imperfect, that a right use of reason might lead us to deceive ourselves (Descartes is not the only one who has used this sort of argument). Nevertheless, he is willing that it should be put forward only as an hypothesis. And though both religion and reason teach that God made the world complete, and not only the seeds of plants were formed, but plants themselves, &c., yet the nature of things will be better explained if it can be shown how, as from seed, the solar system was produced (Descartes here fears the imputation which was afterwards cast upon the author of the nebular *hypothesis* [SOLAR SYSTEM, p. 199]). All matter originally consisted of particles, forming numbers of fluid heavens, revolving about their several axes. These particles were originally equal in size and motion; they also became spherical, when the corners had been worn down by rubbing against each other. And since no portion of space can be vacant [VACUUM], the interstices of these spheres must be filled by matter, of form perpetually changing, derived from the parts worn off the angles: this last kind of matter moves more quickly than the other. Besides this there is a third sort of particles of matter, more solid, or else of form more adapted to motion: of this planets and comets are composed. There are three classes of celestial heavens: the first, that of our sun and its system; the second, the various heavens of the fixed stars immediately adjoining: the third including all which are beyond, and which never can be seen in this life. The *primary* particles, as those are called which are obtained by attrition from the secondary particles, at last become more than enough to fill the intervening spaces (how this could be Descartes does not say), and the residue, as fast as it arises, was forced to the centres of the vortices, where it formed certain very fluid spherical bodies: these are the sun and fixed stars. The secondary particles receded from the centres to make room. The efflux of these primary particles from the fluid bodies just described is light. The centrifugal force of particles in motion round a centre is then dwelt on, and the circular form of the sun and fixed stars is attributed to it. The motion of the vortices must be such that their contiguous parts may have a common motion. The primary particles flow from the poles of each vortex towards the centre, and from the centre towards the other parts. But the same must not be said of the secondary or spherical particles (the reasons given are fanciful in the extreme, consisting entirely in different motive powers given to the two species of particles).

The preceding may give a sufficient idea of the sort of foundation which Descartes builds upon, and his manner of raising the structure. He proceeds through what he supposes to be explanations of all the phenomena of light, of the formation of planets and comets, and of all the varieties of conformation which are seen in the solar system. Why comets have tails and planets none; how the primary particles of other vortices find their way into ours, so that we can see the fixed stars; how the planets obtained their first motions of projection; how the spots on the sun are formed, and so on, are all explained by the powers of the two species of particles: an hypothesis on their nature being always ready when wanted. A reader who has looked into this book of Descartes's 'Principia' begins to understand two things better than before: first, the satire on philosophical explanations contained at the end of Molière's 'Malade Imaginaire,' written a few years after the death of Descartes; next, the declaration of Newton, *Hypotheses non fingo.*

As the hypothesis of vortices is usually represented, it has a certain reasonableness of appearance, which no doubt makes many wonder why it should be so universally contemned. If a fluid mass were whirled round the sun, it would carry the planets with it: and the supposition of minor vortices, one round each planet which has a satellite, is perfectly consistent with the laws of hydrostatics. When Newton proposed to refute the system of Descartes, he was obliged to have recourse to numerical consider-tions: he could not but admit that a planet, in one of Descartes's vortices, would have an orbit; but he showed, from the nature of fluid motion, that it could not have *the* orbit which, from the time of Kepler, it was known to have. The quality of a phenomenon is known before its amount is measured; and it is natural to expect, in the history of philosophy, that explanations which serve to account for the nature of a phenomenon, but are irreconcilable with its amount, should precede those which are drawn from consideration of both. The possibility of the planetary motions finding their proximate cause in the rotation of a fluid mass which fills the solar system, is a thing which did suggest itself, and ought to have suggested itself, to the inquirers of the time which elapsed between Copernicus and Newton. Descartes says expressly, 'putandum est, non tantum Solis et Fixarum, sed totius etiam cœli materiam fluidam esse; *quod jam vulgo omnes astronomi concedunt*, quia vident phænomena planetarum vix aliter posse explicari.' No mechanical difficulty stood in the way in their time; and those who had seen particles of dust whirled about by the air would have no difficulty in imagining the hypothesis of a vortex. Now we find this fault with the common notion of Descartes's system: the disparagement which belongs to it *as a whole*—to the primary and secondary particles which, though obtained from the same original particles, yet have different laws of motion, and to the gratuitous deduction of everything from this fancy—is conveyed to their readers by writers who only present the most rational extract which could be made, namely, the idea of a vortex. This is the sort of syllogism on which such writers proceed: Descartes's system is ridiculous; all I know of that system is its vortices, therefore I must laugh at the vortices. Yet not only was Newton obliged to have recourse to his most powerful weapons to refute these vortices, but it is not at all a settled point that his refutation is sound; that is, his mathematical refutation. His remark that comets could not find their way through the vortex is much more to the purpose, though Descartes has his way out of this difficulty, as out of every other.

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* The matter in the space about a planet, or star, which is under the influence of that planet, is called its *heaven.*

VORTICIA'LIS, Lamarck's name for a genus of microscopic Foraminifera.

VOS, MARTIN DE, one of the most remarkable painters of his time, was born at Antwerp in 1520, or more probably 1531. His father, Peter de Vos, who was likewise a painter and a member of the Academy of Antwerp, gave him the first instruction in his art, and he afterwards attended the school of the celebrated Frans Floris. From the school of Floris he went to Italy, where he studied some time at Rome, and at Venice with Tintoretto, whose style he adopted, and for whom he painted several landscapes as backgrounds to some of his pictures. He distinguished himself in history and portrait, and painted many portraits for the house of Medici. After a stay of eight years in Italy he returned to Antwerp, and brought home with him, besides other studies, a large collection of drawings from antient vases, &c., from Greek and Roman monuments, which he made use of to great advantage in several pictures of feasts and such subjects. In 1559, shortly after his return, he was made a member of the Academy of Antwerp. He executed an immense number of works: there are more than six hundred prints after his designs; he painted more pictures than any man of his time. He amassed a considerable fortune, and died in 1603, aged 72, or, according to the common account, in 1604, aged 84.

De Vos had great ability, and many of his great pictures are composed, designed, and coloured in a masterly style, yet his figures, like those of his model Tintoretto, are often forced and exaggerated in their attitudes. He formed a good school, and educated several excellent scholars; the most distinguished were his nephew William de Vos, and Wenceslaus Koeberger or Coubergher.

William de Vos was one of the painters whose portraits were painted by Vandyck for the collection of the distinguished artists of his time. There were several other painters of this name, of the same and of different families. There was a Peter de Vos, the brother of Martin; a Simon de Vos (born at Antwerp in 1603, and died in 1662), the scholar of Rubens, who excelled in portrait and in animal painting; a Paul de Vos (born at Aelst about 1600, died in 1654), a celebrated battle painter, and his son Cornelius, who was a good historical painter; he died at Antwerp in 1751, aged 61. There was another Cornelius de Vos, who studied under and imitated Vandyck; and there was also a Lambert de Vos of Mechlin, who, in 1574, went to Turkey and made many excellent water-colour drawings of Turkish costume. A volume of these drawings upon Turkish paper is or was in the gymnasium library of Bremen.

(Van Mander; Descamps; Füssli, &c.)

VOSGES, a department in the eastern part of France, bounded on the north by the department of Meurthe, on the north-east by that of Bas Rhin, on the east and south-east by that of Haut Rhin, on the south by that of Haute Saône, on the west by that of Haute Marne, and on the north-west by that of Meuse. Its form is that of an irregular quadrangle, having its northern side 85 miles long, measured in a straight line from the junction of the three departments of Haute Marne, Meuse, and Vosges, to the bank of the little river Bruche at the spot where it quits the department; and the southern side 45 miles long from Chatillon-sur-Saône to the junction of the three departments of Haute Saône, Haut Rhin, and Vosges. Of the remaining two sides, one, 53 miles long, faces the east, or east by south; the other, 41 miles long, faces the south-west. The department is comprehended between 47° 48′ and 48° 33′ N. lat. and between 5° 27′ and 7° 20′ E. long. Its area is estimated at 2268 miles, which is a little under the average area of the French departments, and rather less than the conjoint areas of the English counties of Cumberland and Westmoreland. The population in 1826 was 379,839; in 1831, 397,987; and in 1836, 411,034; showing in the last five years an increase of 13,047, or about 3·3 per cent., and giving about 181 inhabitants to a square mile. In amount and density of population it is above the average of the departments of France, and very far above the English counties with which we have compared it. Epinal, the chief town, is 189 miles in a direct line east-south-east of Paris, or 232 miles by the road though Meaux, Château-Thiérry, Epernay, Châlons-sur-Marne, Vitry-sur-Marne, Bar-le-Duc, Neufchâteau, and Mirecourt: in 48° 11′ N. lat. and 6° 27′ E. long.

The department is altogether mountainous, at least hilly: though it is usual to distinguish the eastern part as the Mountain, and to call the western part the Plain. The Vosges, from which it takes its name, extend along the eastern boundary; and the Faucilles traverse the department from west to east, and unite with the branches of the Vosges about Plombières, in the south-eastern part of the department. The Vosges present a great variety of picturesque and delightful scenery. The Ballon d'Alsace, one of their highest summits, at the point where the branch which joins the Faucilles diverges from the main chain, is 4124 feet high; Le Bressoir, a neighbouring summit, is 4049 feet; and Le Grand Donnon, farther north, is 3314 feet.

The Vosges, and that part of the Faucilles which is nearest to the Vosges, are composed chiefly of granitic rocks. Upon the granite rests the red and the variegated sandstone; upon these sandstones the thick limestone rock called the muschelkalk, and the keüper, or marnes irisées (variegated marls); and upon these, the lias and the lower oolitic rocks. These formations cover the whole of the department; the upper formation, the oolitic, occupying the western side, and the others successively cropping out as we advance eastward. The mineral treasures of the department are considerable. Granite, porphyry, freestone of a black colour, capable of receiving a good polish, millstones, slates, gypsum, and agates are found. A little coal is procured. There were in 1834 two coal-pits, but only one of them was worked: it gave employment to 54 labourers, and yielded 2168 tons of coal, valued at 929*l*. In 1835 the produce was 1356 tons. Iron-stone is procured. There were in 1834 twenty-seven iron-works of various kinds; in which were 8 furnaces for making pig-iron; 58 forges for making wrought-iron, and 5 forges for making steel. The furnaces were chiefly in the western part of the department, where the fuel employed in them was charcoal, together with coal, coke, turf, or wood. In the eastern part, where two of the furnaces and nearly all the forges were situated, the fuel exclusively employed was charcoal. Some of our authorities speak of copper, silver, and manganese mines; but, as the government returns for 1836 do not notice them, it is probable they are no longer worked.

The department belongs chiefly to the basin of the Rhine. A small portion, which extends in the north-eastern corner, just across the ridge of the Vosges, is drained by the Bruche, which rises in those mountains and flows down into the Ill near Strasbourg. The central parts are drained by the Moselle, one of the largest affluents of the Rhine, and its tributaries. The Moselle rises in the south-eastern corner of the department, near the Ballon d'Alsace, and flows north-westward by Remiremont, Epinal, and Charmes into the department of Meurthe. It receives the Vologne and Durbion on the right bank. The Meurthe rises in the slopes of the Vosges, on the eastern side of the department, and flows north-west into the adjacent department of Meurthe, where it joins the Moselle. The Mortagne, a feeder of the Meurthe, and the Madon, a feeder of the Moselle, rise in the department of Vosges, but do not join their principal streams till they reach the department of Meurthe. The Plaine and the Rabodot, feeders of the Meurthe, rise in other departments, but join their principal stream in this.

The north-western side of the department belongs to the basin of the Meuse, and is drained by the Meuse, which crosses it from south to north; and by the Lainger or Ainger, the Mouzon, the Vair, the Deuil, and the Saunel, feeders of the Meuse. A very small part, just at the north-western corner, is drained by the Ornain, which belongs to the system of the Seine.

The southern border of the department belongs to the basin of the Rhône, and is drained by the Saône, which rises on the southern slopes of the Faucilles, and by the Coney, the Angronne, and the Combaute, which flow directly or ultimately into the Saône.

None of these rivers are navigable; nor are there any navigable canals. Irrigation is well managed; and considerable skill is shown in applying streams and falls of water as a moving-power to the purposes of manufacture. There are some mineral-springs. Those of Bussang, five in number, near the sources of the Moselle, rise from the primitive rocks of the Vosges: they are chalybeate and purgative: the water is not much used on the spot, but 20,000 bottles are sent yearly to Plombières or other places. The waters of Contrexeville on the Vair, not far from its source, are chalybeate and diuretic; they are recommended for persons afflicted with the stone and gravel: 4000 bottles of the water are sent yearly to Paris. Those of Bains near Fontenois, in the southern part of the department, are warm and saline; their temperature is 32° of Réaumur, or 104° of Fahrenheit. Those of Plombières are also warm and saline; and are recommended for complaints of the stomach and for nervous affections; their temperature is 38° of Réaumur, or 117° or 118° of Fahrenheit.

There are several small lakes or meres, chiefly in the eastern part of the department: the principal are those of Gérardmer, of Retournemer, and of Longemer; all in the neighbourhood of the town of Gérardmer.

There were, on 1st January, 1837, six Routes Royales, or government roads, having an aggregate length of 178 miles, of which 148 miles were in good repair and 30 miles out of repair. One of the roads from Paris to Bâle, or Basel, enters the department near Domremi, runs by Neufchâteau, Châtenois, Mirecourt, Dompaire, Epinal, and Remiremont, and crosses the Vosges into the department of Haut Rhin. A road from Besançon to Nancy and Metz runs through the department, entering on the south side by Plombières, crossing the Faucilles and passing by Epinal and Charmes. A road from Dijon to Nancy crosses the north-western part of the county through Neufchâteau; and a road from Paris by Nancy to Schelestat, and so to Strasbourg on the one hand or Colmar on the other, passes through Raon l'Etape and St. Diey in the north-eastern part, and across the Vosges into the department of Haut Rhin. The departmental roads had, on 1st January, 1837, an aggregate length of 414 miles, of which 199 miles were in good repair, 167 miles out of repair, and 48 miles unfinished. The vicinal roads had, at the same time, an aggregate length of more than 2500 miles.

The area of the department is about 1,450,000 acres, of which about 600,000 acres are under the plough. The soil of the Plain is tolerably fertile; but, on the whole, the produce of the department in grain is below the average of France, and quite inadequate to the supply of the dense population. The principal crop is of oats, in which the department exceeds the average produce of the departments in the proportion of three to one; but in barley, and still more in wheat, rye, and maslin (wheat and rye mixed), it falls short of the average. Buckwheat is but little grown, and maize and potatoes were, in 1827, not grown at all. Of the crop of oats, the superabundance is sent into the department of Meuse. Turnips and a considerable quantity of hemp are grown, and hops in the neighbourhood of Rambervillers, or Remberviller: of the hops about 2000 cwts. are sent to Paris; some are also sent to Strasbourg. The grass-lands amount to 180,000 acres, and the heaths and open pastures to about 90,000. They are chiefly in the mountains. The number of horned cattle is above the average number in the other departments, especially of cows and heifers. The dairy is much attended to, and above 150,000 kilogrammes, or about 30,000 cwts. of cheese are made annually. The cheeses resemble those of Gruyère; the best are made in and round Gérardmer; those of Bresse, Cornimont, Ventrou, Bussang, St. Maurice, Ramonchamp, Mesnil, Saulxure, and Verguey rank next. A considerable quantity of butter is also made, and sent into the neighbouring departments. The breed of horned cattle is small, as well as that of horses, which are numerous. There are but few sheep, and they are chiefly of a small native breed. The Merino sheep had not, in 1827, been introduced into the department. Pigs are numerous.

The vineyards comprehend about 11,000 acres, and the orchards and gardens occupy about the same space. The produce of the vineyards is great in proportion to the extent of ground, and the temperate habits of the people render much importation of wine unnecessary. The red wines of Charmes, Xaronval, and Ubexy are the best, but none of them rank higher than good common wines. The quantity of stone-fruits grown is considerable; among them are the Quetch or German plum, and the cherry from which kirschenwasser is made.

The woodlands have an area of above 300,000 acres, and the forests and wastes 170,000 acres; their produce, especially in deals and staves for casks, constitutes one of the most important sources of wealth in the department. More than a hundred saw-mills, moved by water, are employed in sawing deals, of which a million are made yearly; they are floated down the Meurthe, and then down the Moselle to Metz. The staves, of which half a million are made yearly, are floated down the Coney, or Conny, into the Saône.

Game is tolerably plentiful: the wild boar, the deer, the hare, the partridge, the lark, and the heath-cock are found. The rivers produce fish of various sorts; among them are some excellent trout.

The department is divided into five arrondissements as follows:—

Arrondissement.	Situation.	Area in Sq. Miles.	Communes.	Cantons.	Population 1831.	1836.
Epinal . . .	Central	569	6	129	91,576	[illegible]
Mirecourt . .	do.	414	6	143	[illegible]	[illegible]
Neufchâteau .	W.	431	5	132	63,976	[illegible]
Remiremont . .	SE.	327	4	36	64,632	[illegible]
St. Diey . . .	NE.	527	9	107	[illegible]	[illegible]
		2268	30	547	397,987	[illegible]

In the arrondissement of Epinal are—Epinal, on the Moselle, population in 1826, 7951 for the commune; in 1831, 8670 for the town, or 9070 for the whole commune; in 1836, 9526 for the commune [Epinal]; Archette, on the Moselle, above Epinal; Châtel, distinguished as Châtel sur Moselle, at the junction of the Durbion with the Moselle; Remberviller, or Rambervillers, population 4475 for the town, or 4990 for the whole commune, on the Mortagne; and Bruyéres, population 2070 for the town, or 2328 for the whole commune, near the source of the Arentelle, a feeder of the Mortagne. Archette has a paper manufacture of high reputation. Remberviller is on the right bank of the Mortagne, over which is a stone bridge communicating with a suburb on the opposite bank. There are some remains of the walls with which, in 1125, Etienne de Bar, bishop of Metz, surrounded the town. The townsmen manufacture coarse woollen cloth, linens, paper, leather, earthenware, madder, iron, and jewellery. One paper-mill employed, a few years since, a hundred workmen. Considerable trade is carried on in corn and hops. There are an hospital and a public library of 5000 volumes.

In the arrondissement of Mirecourt are—Mirecourt, on the Madon, population, in 1826, 5608 for the commune;

in 1831, 5205 for the town, or 5574 for the whole commune; in 1836, 5684 for the commune: Dompaire, on a small stream flowing into the Madon; Ville sur Illon, on the Illon, a small feeder of the Madon; Charmes (pop. 2800 for the town, or 2962 for the commune), on the Moselle; Fontenois, on the Coney or Concy; Darney and Monthureux, on the Saône; and Wittel, on a small stream flowing into the Vaire. Mirecourt was called in the Latin of the middle ages Mercurii Curtis; but there are no remains of antiquity or tokens of the worship of Mercury, which some have supposed, from the name, to have been practised. It belonged in the fifteenth century to the counts of Vaudemont, and was defended by a wall and by a castle, which latter was taken by La Hire, one of the captains of Charles VII. of France. The town is in a pleasant and highly cultivated district, but is ill built. The townsmen are chiefly engaged in the manufacture of musical instruments; a great number of church organs and bird-organs, and of base-viols, violins, guitars, and other stringed instruments are made. Lace, leather, and wooden wares are also manufactured; and trade is carried on in wine, brandy, and sheep. There are four yearly fairs. Mirecourt has several fountains, a handsome hospital, and a public library of 6000 volumes. There are some government offices. Dompaire was formerly of greater importance than it is now: it was taken and burned by the duke of Bourgogne (Burgundy) in 1475, and has never recovered its prosperity. Charmes is on the left bank of the Moselle, over which is a handsome bridge. Trade is carried on in corn, wine, wood, hides, gypsum, and lace: there are a weekly corn-market and four yearly fairs. Fontenois, distinguished as Fontenois-le-Château, was in the middle ages a place of great strength: it belonged to the dukes of Bourgogne (Burgundy). Darney was formerly a place of strength: it has some manufactures of iron-wares and potash: there are six yearly fairs. Wittel or Vittel has four yearly fairs, and is the centre of a lace manufacture of some importance.

In the arrondissement of Neufchâteau are—Neufchâteau, on the Mouzon, near its junction with the Meuse; population of the commune, in 1826, 3667; in 1831, 3524; and in 1836, 3645: Morvillier, or Liffol le Grand (pop. 1656), on the Saunel; Dommartin, on the Vraine, a feeder of the Vair; Vicherey, on the Deuil; Châtenois or Châtenoy, in the country between the Vair and the Mouzon; Bulgnéville, in the country between the Vair and the Lainger or Ainger; Vrécour or Vrécourt, on the Mouzon; Le Grand, near the sources of the Ornain; La Marche (pop. 1625), on a small feeder of the Mouzon; Damblain, close to the south-west border of the department; and Châtillon-sur-Saône, on the Saône. Neufchâteau is a well-built town on a small eminence surrounded by loftier hills. It has an hospital, a communal school, a public library of 7200 volumes, a subordinate court of justice, and one or two fiscal or administrative government offices. The townsmen manufacture coarse woollen cloth, swanskin, cotton counterpanes, wicker wares, and nails and brads; and trade in wood, iron, and hardwares: there are five yearly fairs. Dommartin, distinguished as Dommartin-sur-Vraine, has four yearly fairs for cattle, corn, linen, woollen cloth, baskets, and hardwares. At Châtenois or Châtenoy bird-organs and other organs are made. Vrécourt has some iron-works and tan-yards, and a manufacture of cotton cloth. There are four yearly fairs. Le Grand has considerable nail-factories, and three yearly fairs for cattle, corn, and the linens of the district. La Marche has wrought-iron works and oil-mills or presses. It was the native place of Guillaume or William de la Marche, who founded the college of La Marche at Paris. The town has suffered much in various wars, and by pestilence in 1636. The village of Domremi, on the left bank of the Meuse, close to the north-west border of the department, possesses historical interest as the birth-place of Jeanne or Joan of Arc: it takes from this circumstance the distinctive epithet of Domremi-la-Pucelle. The house in which Jeanne was born is still standing near the church, and is easily recognised by its Gothic doorway surmounted by three escutcheons with fleurs-de-lis, and by an antient statue representing the maid covered with her armour. The late proprietor of the house, named Gérardin, after refusing 6000 francs, or 240*l.*, for it, offered by a Prussian count, who wished to purchase the place, sold it to the authorities of the department for a third of that sum, in order that it might become national property. Louis XVIII. granted him, in reward of his patriotic conduct, the grand cross of the legion of honour, and gave 8000 francs (320*l.*) for the establishment of a free-school in the house of Jeanne for the girls of Domremi and the neighbouring communes, 8000 for an endowment to maintain a Sister of Charity as teacher of the school; and 12,000 (480*l.*) to erect a monument in honour of Jeanne. This monument, which was solemnly inaugurated in 1820, consists of a fountain with a quadrangular base, from which rise four isolated pilasters supporting an entablature with two fronts, and surmounted by a bust of the heroine. It stands in the public place of the village, and has this simple inscription: 'A la mémoire de Jeanne d'Arc'—'To the memory of Joan of Arc.' In the house where Jeanne was born is a picture, painted by order of Louis XVIII., and given by him to adorn the interior.

In the arrondissement of Remiremont are—Remiremont, on the Moselle; population, in 1826, 4148 for the commune; in 1831, 4246 for the town, or 4686 for the whole commune; in 1836, 5055 for the commune: Plombières (pop. in 1826, 1309), on the Angronne; Vagney, on a feeder of the Moselle, and the village of Val d'Ajol (pop. 5958), on the Combauté; Bellefontaine, and Ruaux, near Plombières, and Bussang and Le Tillot, on the Moselle. Remiremont takes its name from Romaric, a noble of the early Frankish period, who had a castle on a eminence near the town (Romarici Mons, Romarimont), and was a favourite of Queen Brunehaut. Falling into disgrace, and becoming weary of the world, he founded on the eminence two abbeys (A.D. 620), one for monks, the other for nuns, and endowed them with all his possessions. These abbeys having been destroyed by the Hungarians in the tenth century, were rebuilt in the plain. The most important of the two was that for lady-canonesses. The inmates were not bound by a monastic vow, and none were admitted who could not prove the nobility of their family for four generations: the abbess was a princess of the empire, and enjoyed the prerogatives and maintained the state of a sovereign. The abbey was rebuilt in 1752, by Anne Charlotte of Lorraine, then abbess; it is now applied to other purposes, and is still the handsomest building in the town. The principal streets of Remiremont are watered by a brook which flows into the Moselle: the houses are old and not well built, but there are some pleasant promenades. There are a communal school, a public library of 4000 volumes, an hospital, and some fiscal or administrative government offices. The townsmen manufacture cottons, paper, leather, wrought-iron, potash, and excellent kirschwasser; and trade in wood, iron, hemp, cattle, cheese, which has a good reputation, and medicinal herbs gathered on the surrounding hills: there are eighteen yearly fairs. Plombières, celebrated for its mineral waters, has an hospital and a beautiful church, built by Stanislas Leckzinski, then duke of Lorraine. Cutlery, remarkable for being well-finished, iron-wares, and paper are manufactured: there are four yearly fairs. Plombières was destroyed by fire in 1498, by an earthquake in 1682, and was almost buried in mud in 1771 by an inundation. Vagney has some iron-works, and good cheese is made in the valley in which it stands: there are twelve yearly fairs. There are iron-works at Belle-fontaine, and a manufacture of cutlery; and at Ruaux iron-works and a manufacture of cotton. Bussang has mineral waters, and Le Tillot, or Thillot, a manufacture of cotton goods.

In the arrondissement of St. Diey are—St. Diey or St. Dié, on the Meurthe; population in 1826, 7339 for the commune; in 1831, 5560 for the town, or 7707 for the whole commune; in 1836, 7906 for the commune [DIE, OR DIEY, ST.]; Raon l'Etape, population 3160 for the town, or 3244 for the whole commune, on the Meurthe, at the junction of the Plaine; Senones, population 1932 for the town, or 2366 for the whole commune, on the Rabodot; and Gérardmer or Géromé, population 1580 for the town, or 5701 for the whole commune, on the Valogne. Raon l'Etape is an old town, poorly built, at the foot of a hill. The townsmen manufacture calico, bed-ticking, awls and brads, and potash; and trade in timber: there are two yearly fairs. The remains of an old castle of Ferri III., duke of Lorraine, are on a hill near the town. Senones suffered great injury from fire in 1811: there are manufactures of cotton-yarn, calico and dimity, iron-works, dye-houses for cotton, and a pottery: there are eight yearly fairs. Gérardmer or Géromé has considerable trade in cheese, which is the best in the department, and in wooden wares and wooden shoes made in the neighbourhood: there are six fairs for timber, cattle, and other merchandize.

The village of Waldbach or Valderback, in the Steinthal or Ban de la Roche, the scene of the pastoral labours of the pious and benevolent Oberlin, is in the valley of the Bruche, in this arrondissement. [OBERLIN.]

The population, when not otherwise described, is that of the commune, and from the census of 1831.

The department of Vosges is one of the principal manufacturing departments in France; it possesses a more than average number of establishments for producing articles for exportation. In the arrondissement of Epinal are iron-works, paper-mills (there were thirty-three in the whole department, in 1827), saw-mills, potteries and tanneries; in the arrondissement of Mirecourt are glass-houses and iron-works, and a considerable manufacture of lace and musical instruments; in that of Neufchâteau are oil-mills or presses, paper-mills, saw-mills, iron-works, and a manufacture of musical instruments, and shoes, of which 60,000 pairs are exported yearly; in that of Remiremont, potash and other chemical products, kirschwasser, and paper are made; and in that of St. Dié wooden shoes, wooden wares, cotton-yarn and other cotton goods, paper, and wrought iron. The exportation of cheese and timber from the department is very great.

The department constitutes the diocese of St. Dié, the bishop of which is a suffragan of the archbishop of Besançon: it is in the jurisdiction of the Cour Royale of Nancy, and in the district of the Académie Universitaire of the same city, and is comprehended in the third military division, of which the head-quarters are at Metz. It returns five deputies to the Chamber. In respect of education it is considerably above the average of France; of the young men enrolled in the military census of 1828-29, sixty-two in every hundred could read and write; the average of France being little more than thirty-nine. There is a consistory of the Reformed church at Saint Diey, and there are some few Baptists (or, as the French term them, Anabaptists) in the department.

The department antiently formed part of the territories of the Leuci (Λεῦκοι, Strabo; Λευκοί, Ptolemy), and the Sequani (Σηκουανοί, Strabo; Σηκοανοί, Ptolemy), two Celtic nations. The Faucilles may be considered as their common boundary; the Leuci being to the north, and the Sequani to the south of those mountains. The small portion of the department which extends across the ridge of the Vosges into the valley of the Bruche was perhaps included in the country of the Tribocci or Triboci (Τρίβοκχοι, Strabo; Τρίβοκοι, Ptolemy), a German people: and possibly a very small portion of the south-western part may have belonged to the Lingones (Λίγγονες, Strabo) or Longones (Λόγγονες, Ptolemy), who were Celts. The Vosges appear in an antient inscription under the name Vosegus; Cæsar writes the name in the same manner, but Lucan has Vogesus: and from Cæsar's describing the Meuse as rising in Mount Vosegus, it appears that the Faucilles, in which that river has its source, were also included under the same name. The antient names of the rivers Meuse, Moselle, and Saône, were Mosa, Mosella (*i.e.* little Mosa), and Arar respectively.

In the division of Gaul made by Augustus all the above-mentioned nations were comprehended in the province Belgica, but on the subdivision of Gaul by later emperors, the Leuci were included in the province of Belgica Prima; the Lingones in Lugdunensis Prima, the Tribocci in Germania Superior, and the Sequani in Maxima Sequanorum. The towns of Solimariaca and Novimagus, belonging to the Leuci (the first mentioned in the Antonine Itinerary, the second in the Peutinger Table), and the Dittatium (Διττάτιον) of Ptolemy belonging to the Sequani, were within the limits of the department; Solimariaca is identified by D'Anville with a position on the Vaire called Soulosse, not far from Neufchâteau; Novimagus with Neufchâteau; and Dittatium with a position a little to the east of Passavant-en-Vosges, near the southern border of the department, called Cité, where a number of Roman remains have been discovered. An amphitheatre near the little town of Le Grand, in the arrondissement of Neufchâteau, popularly called the amphitheatre of Julian, was cleared out in 1821.

On the downfall of the Roman empire, this part of Gaul passed into the hands of the Franks, and in the division of the Frankish territories under the Merovingian princes was included in Austrasia. When the empire of Charlemagne was dismembered, it was included in the territory of the emperor Lothaire, and subsequently formed part of the duchy, and still later of the government of Lorraine.

The greater portion of the department was known, while comprehended in the government of Lorraine, as Le Pays des Vosges, and was subdivided into the bailiwicks of Epinal, St. Diey, Bruyères, Remiremont, Darney, Neufchâteau, Mirecourt, Charmes, and Châtel sur Moselle. A small part about Senones, in the arrondissement of St. Diey constituted the principality of Salm, which belonged to the empire of Germany till 1793, when it was occupied by the French and united to France. The neighbourhood of La Marche, Domremi, and Châtillon-sur-Saône constituted the bailiwick of La Marche, which was part of Le Barrois or the Duchy of Bar. Remberviller was one of the lordships held by the bishop of Metz, and Vicherey was included in the possessions of the chapter of Toul, in Le Toulois, part of Le Pays des Trois Evêché.

(Malte Brun, *Géographie Universelle*; Dupin, *Forces Productives de la France*; D'Anville, *Notice de l'Ancienne Gaule*; *Dictionnaire Géographique Universel*; *Statistique de la France*, printed by the French government.)

VOSGES, in German VOGESEN, or WASGAU, a chain of mountains bounding the valley of the Rhine on the west from the neighbourhood of Mühlhausen, or Mulhausen, to that of Mayence. The chain is partly in France, and partly in the Rhenish province of Bavaria, and in the territory of Hesse Darmstadt in Germany.

There is some difficulty in defining exactly the extent of the range. In most maps the Vosges are made to unite on the south-west with the Faucilles, and so with the Côte d'Or, and ultimately with the Cévennes; and on the south they are made to unite with the Jura. The junction, if it can be so called, is formed by heights of such trifling comparative elevation, that 'if the bed of the sea,' says M. Elie de Beaumont, 'were raised from 300 to 400 yards the Vosges would form an island or archipelago, which, very narrow about Saverne, would have a breadth of 6 or 8 myriamètres (40 to 50 miles) in the parallel of Remiremont, and again in that of Bitche.' Cæsar, one of the earliest, if not the earliest writer who has mentioned the Vosges, which he calls Mons Vosegus, evidently included the Faucilles under the designation, since he places in them the source of the Mosa, or Meuse, which is far westward of the Vosges in the present more limited acceptation of the name. We shall consider the Vosges as extending in length more than 170 miles from the depression through which the Rhône and Rhine Canal, formerly the Canal of Monsieur, passes, near Dannemarie, between Béfort and Altkirch, (and which depression we regard as separating the Vosges from the Jura,) northward, or, more exactly, in a direction north by east to the valley of the Rhine, at the elbow formed by that river between Mayence and Bingen. The breadth of the range varies. In the northern part, about Mont Tonnerre, between the valley of the Rhine and that of the Glan, a feeder of the Nahe, it is nearly 30 miles; but this breadth comprehends the lower slopes as well as the higher parts of the range. West of Strasbourg, between the valleys of the Rhine and the Saar or Sarre, the breadth is about 20 miles. Between Colmar and Plombières, where a branch extends westward from the principal range, the breadth is nearly 40 miles. The breadth assigned to the range by M. Elie de Beaumont can be assigned to it only by including in the parallel of Bitche the hills west of the Sarre about Sarreguemines; and in the parallel of Remiremont, those which extend west of Epinal and Plombières to the valley of the Meuse. Another branch extends in a south-western direction from the southern extremity of the main chain in the direction of Vesoul.

The loftiest summits of the range are in a tolerably direct line, extending from Mont Tonnerre, in German Donnersberg, in the Rhenish province of Bavaria, to the Ballon d'Alsace, near Giromagny and Masvaux, in the department of Haut Rhin in France; and in a line extending nearly at right angles to the foregoing, from the Ballon d'Alsace towards Plombières. The following are some of the principal summits:—

	Feet.	
Ballon de Lure	3721	Near the sources and upper waters of the Moselle and Oignon.
Ballon de Servance	3970	
Ballon d'Alsace	4124	
Bæhrenkopf	3064	
Ballon de Soultz, or de Guebwiller	4695	
Le Haut d'Honec	4391	
Les Chaumes	4203	
Le Bressoir	4049	Near the source of the Meurthe.
Le Champ de Feu	3537	Near Schirmeck.
Le Grand Donnon	3314	At the source of the Saar or Sarre.
Mont Tonnerre, or Donnersberg	2924	

Sources of Rivers.

	Feet.
Oignon	2276
Saône	1299
Moselle	2379
Saar	1765

The source of the Saône can be considered as belonging to the Vosges only by comprehending under that name the mountains west of Epinal and Plombières.

The part of the range which is north of the valley of the Bruche is sometimes termed Les Basses-Vosges, or Lower Vosges, and is known to the Germans by the name of Hardt.

The line joining the principal summits is nearer to the eastern side of the mountains, on which side the descent towards the valley of the Rhine is much steeper than on the western side toward Lorraine. The side towards the Rhine consists of a succession of steep slopes, extending with little interruption from the valley of Thann to the neighbourhood of Landau. The valleys on this side of the range are deeper than those of the west side, where a slightly undulated surface gradually descends into the plain of Lorraine.

The highest summits are comprehended in a triangular space, of which the apex may be fixed at Schirmeck, in the valley of the Bruche, in the north-eastern corner of the department of Vosges, and the angles of the base at Plombières, in the department of Vosges, and Masvaux, in that of Haut Rhin. In this triangular space the rocks are cristalline, connected and intermingled with others which contain organic remains. Both classes of the rocks thus mingled together are considered by M. Elie de Beaumont as belonging to the transition series: they comprehend granite, gneiss, mica slate (but in small quantity), sienite, porphyry, serpentine, talcose slate, clay-slate, grauwacké, saccharoid and compact limestone, and the formations of the carboniferous group. They ordinarily present rounded summits, called by the inhabitants of the district 'Ballons' (or balls), a form owing, in part at least, to the facility of disintegration which most of them possess. They abound with springs and with deposits of peat, which are met with at various elevations. The transition rocks appear but rarely beyond the limits of the space defined above. The beds of slate and the masses of unstratified rock have their principal extension east and west between Plombières and the Ballon d'Alsace, and north and south between the Ballon d'Alsace and Schirmeck.

The three sides of the triangle occupied by the granitic rocks are skirted by ranges, more or less continuous, of mountains of a character altogether different, of square form and more horizontal outline. These are composed of a reddish quartzose sandstone, known as the sandstone of the Vosges, in the wider application of that name, of more recent origin than the carboniferous rocks, on which in some places it is found to rest, but not conformably. On the south side of the triangle occupied by the transition rocks, the sandstone range is narrow and much interrupted. On the east side of the transition rocks this sandstone is deeply intersected by valleys opening into the great valley of the Rhine, to which valley it presents steep escarpments. On the north-west of the triangle the sandstone occupies a much larger space and descends more gradually toward the plain of Lorraine. North of Schirmeck, as far as the parallel of Mannheim, this sandstone forms the mass of the Vosges, and presents a range of heights of tolerably uniform elevation, but of unequal breadth. The strata in this part dip gradually to the north-north-west until they are covered by the more recent formations which constitute the undulated plains of Lorraine; while on the eastern side, toward the Rhine, they still present the steep escarpment characteristic of that side of the Vosges, broken by deep and narrow valleys. The sandstone of the Vosges contains no organic remains. The lower beds have a close resemblance to the rothe-todtc-liegende of the German geologists and to the conglomerate of Exeter in Devonshire: the upper beds gradually become finer in grain and of greater solidity; and to these the name of sandstone of the Vosges in a more special and limited application of the term is given. These upper beds in their mineralogical character hold an intermediate station between the lower beds on which they rest and the grès bigarré which rests upon them, and present some analogies with the new red-sandstone of Cheshire, Lancashire, and Cumberland.

Towards the foot of the mountains the sandstone of the Vosges is covered by the grès bigarré, or variegated sandstone, this by the muschelkalk, and this again by the marne irisée, or variegated marl: all these formations belong to the same group as the new red-sandstone and red marl of the English geologists. They occupy an undulating district extending on the east not very far from the mountains, being covered by the tertiary deposits and the alluvium of the valley of the Rhine; but on the west they extend a considerable distance from the principal range, until they are covered by the lias, which forms a range of hills extending from Luxembourg to Bourbonne-les-Bains. The variegated sandstone generally forms low rounded hills at the foot of the loftier elevations formed by the sandstone of the Vosges; but where the latter does not attain any great height, it is sometimes covered to the very summit by the variegated sandstone, which seems to rest upon it unconformably. The lower beds of the variegated sandstone are very thick, and consist of a fine-grained sandstone of a reddish purple tint. The upper beds are not so thick, and are quarried for grindstones; the uppermost beds are still thinner, and are quarried for paving and for roofing houses. They sometimes lose their consistence, and pass into a variegated clay, which is used for brick-making. Masses of gypsum are frequently found. The upper beds of the variegated sandstone sometimes resemble the lower beds in colour, but are more often than these of a bluish grey. Organic remains, especially of vegetables, are common in these formations.

The upper part of the variegated sandstone series offers thin beds of calcareous marl or of dolomite, which form the commencement of the muschelkalk series; these beds become closer as we ascend, until the sandstone entirely disappears. The muschelkalk is generally composed of a grey or smoke-coloured compact limestone, frequently of conchoidal fracture, at other times of a fracture even when regarded on a large scale, but uneven when minutely examined. The upper beds of the muschelkalk series often consist of a schistose grey marl, which, as we ascend, gradually assumes a greenish tint; still higher the schistose structure diminishes, and the green tint becomes more decided, and is frequently marked by patches of red.

The marne irisée, or variegated marl series, consists of beds of marl of a red colour like that of wine-lees variegated with a greenish or bluish grey. About the middle of the series is constantly found a small group of strata comprehending a blackish schistose clay; a fine-grained, earthy sandstone, of a bluish-grey or reddish-purple colour; and a greyish or yellowish compact magnesian-limestone; in this group the magnesian-limestone frequently constitutes the uppermost member, resting on the sandstone and schistose clay, which alternate with each other or with the red marl. The sandstone and schistose clays contain impressions of vegetable remains, and frequently beds of a combustible substance, which has been worked on a small scale. Gypsum and rock-salt are found in the variegated marl, below the group just described, and gypsum occasionally appears above it. The uppermost beds of the variegated marl frequently assume a greenish tint, which distinguishes them from the rest of the mass. Thin beds of black schistose clay and of quartzose sandstone, almost without any cementing matter, appear: these gradually supplant the green marl, and form the commencement of the sandstone (belonging to the quadersandstein of the German geologists) which forms the lowest member of the lias group.

The Vosges yield a variety of valuable minerals, but they are not worked to any great extent, at least in France. Coal is found in various parts; but all the departments adjacent to the principal range (Moselle, Meurthe, Vosges, Haute Saône, Haut Rhin, Bas Rhin) had not, in 1834, more than 11 coal-pits, of which only 9 were at work: the produce was about 40,000 tons, nine-tenths of which came from the single department of Haute Saône. In 1835 the produce was little more than 21,000 tons. Iron-ore is obtained, and a number of iron-works are established in the neighbouring country. There were, in 1834, 95 establishments of all kinds (furnaces, forges, &c.) in the departments just mentioned. Other metallic ores are found; copper in the department of Haut Rhin; lead in the departments of Vosges and Haut Rhin; manganese in that of Vosges; and arsenic in that of Haut Rhin. But these ores are scarcely worked, if at all.

'The summits of the Vosges,' says Malte-Brun, 'covered with snow during a part of the year, extend their influence over the different parts of the neighbouring country in proportion to the distance which separates them from it. . . . The greater part of these mountains are wooded only to a certain height; their summits are covered with large spaces of green turf, to which, during six months of the year, herds of cows, hired for the season in the villages, are led to graze. The men who follow this occupation rarely descend into the plain; they dwell in huts, and make cheeses like those of Gruyère.' The forests are chiefly composed of firs, pines, oaks, and chestnut-trees. The variety of vegetation which the mountains present renders them interesting to the botanist: and though little visited by the picturesque tourist, they present, in spots remote from the principal roads, scenery which may vie with that of Switzerland. Wine is grown in those parts of the mountains which present a favourable aspect.

A great number of streams rise in the Vosges. Those which rise on the eastern slope of the principal range fall into the Rhine or its feeder the Ill; and, from the proximity of the mountains to those rivers, have commonly but a short course. The Techt, or Fecht, the Bruche, the Zorn, the Moder, the Sarbach or Surbach, the Lauter, the Speyer or Speyerbach, the Eiss, and the Selz, are the principal. Most of the streams which arise on the western side also belong to the system of the Rhine. The Moselle, with its feeders the Meurthe and the Saar or Sarre, are the most important. The Vologne also flows into the Moselle; the Mortagne, the Fines, and the Vezouze, into the Meurthe. The Erbach joins the Sarre. The Glan and the Alsen flow into the Nahe, an affluent of the Rhine, which joins that river at Bingen. The Vosges may be regarded as separating the basin of the Rhine proper from the sub-basin of the Moselle. The streams which flow from the western side of the range near its southern extremity, and those which rise on the southern slope of the branch range, leading from that extremity toward Plombières, belong to the system of the Rhône, the basin of which is divided by the branch range from the sub-basin of the Moselle. The Saône, the most important tributary which the Rhône receives, rises in the branch range; as do the Coney or Coney, the Angronne, the Lantenne, and the Oignon, which flow into the Saône, and the Savoureuse, which flows into the Doubs, a principal affluent of the Saône.

(Elie de Beaumont, *Sur les Terrains Secondaires du Système des Vosges*, in the first volume of the *Mémoires pour servir à une Description Géologique de la France*; *Encyclopédie Méthodique* (*Géographie Physique*, art. *Vosges*); Malte-Brun, *Géographie Universelle*; *Dictionnaire Géographique Universel*. The heights are from a table given in the sixth volume of the *Companion to the Almanac*.)

VOSS, JOHANN HEINRICH, was born on the 20th of February, 1751, at Sommersdorf, near Wahren in Mecklenburg. His father was originally a farmer; but, soon after the birth of his son, he got the office of collector of the tolls for Count Malzahn in the little town of Penzlin, and had a house and the privilege of brewing and distilling. In this place Johann Heinrich received his first education. He showed such an extraordinary memory and such a desire to learn, that his father, although his circumstances were continually growing worse, sent him to the public school at Neu-Brandenburg. Benevolent friends and relatives contributed towards the expenses of his education, as he showed all the signs of extraordinary talent. Greek was then taught at Neu-Brandenburg in a very unsatisfactory way. Voss felt it; and being already charmed with the beauties of that language, he and some of his schoolfellows had their weekly meetings, in which they communicated to one another what they had learned in private, and thus studied the Greek writers themselves. German poetry also was read and discussed at these meetings, and Voss already commenced writing German poetry which attracted the attention of his friends and acquaintances. After having been at Neu-Brandenburg for two years, he saw that a longer stay would be useless; and as he had no means of continuing his studies at a university, he gladly accepted a place as private tutor in the family of a country gentleman near Penzlin. He entered this situation in 1769. As he had not yet been at a university, his salary was less than that of the cook in the family; and he had to endure many humiliations which might have broken his spirits if he had not thought it his duty to hold out in order to get a small sum which might enable him at least to begin his academical career. Another circumstance which helped him over the difficulties of his position was the friendship of a neighbouring clergyman, who saw the great talents of Voss, made him acquainted with the German poets, and drew his attention to Shakspere, to understand whose works Voss immediately began to learn English. Boie, who was then the editor of the 'Göttinger Musenalmanach,' received some of Voss's poems as contributions, and was so pleased with them, that he invited the author to come to Göttingen, where he promised him all the assistance in his power. After repeated invitations Voss went, in 1772, to Göttingen, where, through the mediation of Boie, he obtained free board (Freitisch), and also the means of making a small income. Here Voss became acquainted with Heyne, who received him as a member of the philological seminary. The influence of Boie and of the numerous circle of aspiring young men then assembled at Göttingen, who formed a society under the name of Hainbund, for the purpose of cultivating poetry and improving the national taste, soon drew out the genius of Voss, and he took a very prominent part in the proceedings of the society. He had come to Göttingen with a view to study theology, but he changed his views and devoted himself to the study of philology, with the hope of obtaining the office of teacher in some public school. In his critical exercises in the philological seminary he occasionally differed from Heyne, and thus excited his ill-will; the consequence was that Voss did not attend the seminary so regularly as was expected, though he continued his studies the more zealously in private. This ill-feeling between Heyne and Voss was the foundation of all their subsequent disputes and enmity. During his stay at Göttingen Voss made the acquaintance of Klopstock and Claudius; and in 1774, when Boie left Göttingen, the editorship of the 'Musenalmanach' was given to him. In 1775 Voss also left the university, spent some time at Hamburg, and then went to his friend Claudius at Wandsbeck. In 1777 he married Boie's youngest sister, and the year after he was appointed rector of the public school at Otterndorf, in the country of Hadeln. Soon after settling there he announced his intention of publishing a German translation of the 'Odyssey' in hexameter verse; and in order to convince the world of his competence, he published, in 1780, a dissertation on the island of Ortygia in the 'Deutsches Museum,' and another on the Ocean of the antients, in the 'Göttinger Magazin,' which was edited by Forster and Lichtenberg. The peculiar mode which he adopted of writing Greek names drew upon him the severe censure and sneers of Lichtenberg, who was at the same time one of the champions of Heyne. This completed the breach between Voss and Heyne, and the disputes with Lichtenberg continued for several years, and became at last mixed up with such personalities, that Voss found it necessary to write an essay in vindication of his own character in the 'Deutsches Museum.' In 1781 Voss published his German translation of the 'Odyssey,' which was received with the unanimous approbation of all competent judges. The marshy district of Otterndorf being detrimental to the health of Voss, through the influence of his friend Count Frederic Leopold Stolberg he was invited to the rectorship of the gymnasium of Eutin. He arrived here in 1782, and his circumstances, which had hitherto been extremely limited, were soon greatly improved, and he was further honoured with the title of 'Hofrath.' Being thus in easy circumstances, he devoted his time to the discharge of his duties and to the study of the antients, whose works it was his pride to nationalize among his countrymen. At the same time he continued to write original poems, which are among the best in the literature of Germany. In 1789 he published his edition of Virgil's 'Georgics,' with a German translation, a commentary, and several engravings representing various forms of antient ploughs. A new and much improved edition appeared in 1800. 2 vols. 8vo. In 1793 he published his translation of the 'Iliad' and 'Odyssey,' in 4 vols., in 8vo. and 4to. That of the 'Odyssey' was an improvement upon the edition already published; but although it is more correct, its character is less simple than that of the first edition. During this time he was also engaged with researches on antient geography and mythology; and in order to counteract the views on mythology proposed by G. Hermann, in his 'Handbuch der Mythologie,' which was extravagantly praised by Heyne and his friends, Voss wrote an essay on Apollo, which was soon after followed by his Letters on Mythology ('Mythologische Briefe,' Königsberg, 1794, 2 vols. 8vo.), which were mainly directed against Heyne. A second and enlarged edition of these letters appeared at Stuttgard, 1827, 3 vols. 8vo. No year passed without proofs of the genius and learning of Voss. In 1797 there appeared, in 2 vols., his edition of Virgil's 'Eclogues,' which, like the 'Georgics,' was accompanied by a German translation and an excellent commentary. Two years later he published his translation of all the works of Virgil, but without a commentary. The numerous original poems, which had appeared either in small collections or in periodicals, were now collected and published in 1802, in 4 vols. 8vo. This collection contains, in an appendix, an essay on German prosody ('Zeitmessung der Deutschen Sprache'). In this year he also produced a new edition of his translation of Homer, to which he added a map of the Homeric world, and a plan of the palace of Odysseus.

His intense study and incessant literary activity, together with his heavy duties as rector and teacher of the gymnasium of Eutin, and various other painful occurrences, had so much weakened his constitution that it was impossible for him to continue in his office. His physician urged the necessity of a residence in Southern Germany. Duke Peter Frederic of Holstein-Gottorp, though with great reluctance, not only allowed Voss to resign his office, but granted him an annual pension of 600 thalers. In the autumn of 1802 Voss went to Jena, where he lived for some years in private, enjoying the friendship and esteem of the professors in that university, and of all the illustrious personages then assembled at Weimar.

It was during his stay at Jena that he wrote the review of Heyne's edition of Homer, which created a general sensation in Germany ('Jenaer Allgem. Literaturzeitung,' for May, 1803). In 1805 Voss received a letter expressing the desire of the elector of Baden that he should come to Heidelberg, and give a few lectures in the university; or, if his health should not permit him to lecture, the elector offered him a pension of 500 florins if he would merely settle at Heidelberg. While Voss was hesitating whether he should leave all his friends at Jena and Weimar, a second letter arrived, offering him an annual pension of 1000 florins if he would settle at Heidelberg, and by his mere presence give lustre to the university. This generous offer, which raised him above all want, was gratefully accepted; and in the summer of 1805 Voss arrived at Heidelberg. The mild climate of this place, with its beautiful environs, produced a great change in him. He felt himself again cheerful and young, and with renewed ardour he devoted himself to his literary pursuits. The results were improved editions of his earlier works, as well as many new ones. His fourth and last edition of Homer appeared in 1814, in 4 vols., and a revised edition of his translation of Virgil in 1821. Among the new translations of antient writers which appeared during his residence at Heidelberg, were those of Horace (1806 and 1821), Hesiod (1806), Theocritus, Bion, and Moschus (1808), Tibullus and Lygdamus (1810), of which, in 1811, he also published the original text, corrected from MSS., his translation of Aristophanes (1821), and Aratus (1824). Voss had occasionally translated works from the English and French into German: in 1819 he determined, in conjunction with his two sons, Henry and Abraham, to translate Shakspere. The work was not completed till several years after the death of Voss. This translation is not quite what it should be, but it is a proof of the bold spirit and of the unwearied activity of Voss. In 1823 he published the first volume of a work entitled 'Antisymbolik,' which was directed against the mythological work of Creuzer. The second volume was edited after his father's death by Abraham Voss. Frederic Stolberg, who had once been a kind and sincere friend to Voss, had become a convert to the Roman Catholic religion in the year 1800; and many years afterwards, in 1819, Voss, seeing the intrigues employed by the Mystics and the Roman Catholics in Germany, wrote an essay called 'Wie ward Fritz Stolberg ein Unfreier' (in Paulus's *Sophronizon*, part iii.). This was the opening of a literary campaign against Roman Catholicism, the Protestant Mystics of Germany, and despotism and aristocratic haughtiness, for these were the causes to which Voss attributed the conversion of Stolberg. The sensation which these attacks created divided all Germany into two parties; but both agreed that Voss treated the friend of his youth too severely, and they condemned the personalities in which he indulged. The truth is that Voss and Stolberg were such opposite natures that they could not understand each other: Voss was unable to comprehend the real causes of Stolberg's conduct, as has since been made evident by the letters of Stolberg. Voss died at Heidelberg, on the 30th of March, 1826.

Johann Heinrich Voss is one of the most remarkable men of modern times. He possessed a generous, upright character, without the least affectation. In his family and in his relations to his friends there was a kind of patriarchal simplicity and cordiality. But it cannot be denied that his own opinions of what was right and wrong rendered him frequently blind to what was good in others, and made him appear obstinate and quarrelsome. As a writer Voss ranks among the first that Germany can boast of. His knowledge of antiquity was immense, and the life of the antients was nearly as familiar to him as that of his contemporaries. His commentaries on Virgil's Georgics and Eclogues are among the best that have been written on any antient author, and Niebuhr used to say that nothing was left for any future commentator on those poems, for Voss had done all that could be desired. He is one of the great fathers of modern philology, and worthy to stand by the side of Lessing and F. A. Wolf. As a translator Voss is unrivalled, and the principles which he laid down are still followed by the best translators in Germany. No nation of modern Europe can boast of translations of Homer, Virgil, Hesiod, and Theocritus equal to those of Voss, which are real substitutes for the originals. It was the consequence of his own peculiar nature that he was more successful in his translations of epic and idyllic, than of lyric and dramatic poetry. As a poet he must be classed among the first of his country. His expression is strong and vigorous, his sentiments true and pure, and the amiable part of the German character is perhaps not seen in any modern poet more clearly than in the poems of Voss. The simplicity and the natural charms of his idyllic poems have never been equalled by any German poet, and his epico-idyllic poem, 'Luise,' is the most beautiful production of its kind in any language. His essays have been collected under the title 'Kritische Blätter, nebst Geographischen Abhandlungen,' Stuttgard, 1829, 2 vols. 8vo.

(Paulus, *Lebens- und Todeskunden von J. H. Voss*, Heidelberg, 1826; *Briefe von J. H. Voss, nebst erlaüternden Beilagen*, edited by Abraham Voss, Halberstadt, 1820-33, 3 vols. 8vo.; *Leben des Dichters J. H. Voss*, by F. E. Th. Schmid, in the last edition of Voss's Poetical Works, Leipzig, 1835, p. i.-xxxix.)

VO'SSIUS, GERARD. As his father's name was Johannes Vossius, he called himself Gerardus Johannis Vossius, that is, Gerard Vossius, the son of John. His real family name was Vos, which he Latinized into Vossius. He was born in 1577, in the neighbourhood of Heidelberg, whither his father, who had once resided at Roermonde, in Holland, had gone after he had embraced the Protestant religion. In the year after the birth of his son Johannes Vossius returned to Holland, and settled finally at Dortrecht. Gerard was only seven years old at the time of his father's death. He began his studies at Dortrecht, and, after having acquired a considerable knowledge of Latin and Greek and of the elements of philosophy, he went, in 1595, to the university of Leyden, where the range of his studies was considerably extended. In 1598 he took his degree in philosophy, and began to devote himself with great zeal to the study of theology, ecclesiastical history, and the Hebrew language. About the year 1600 the university of Leyden was on the point of giving Vossius a professorship, when he left the place, being invited by the town of Dortrecht to undertake the head-mastership of the public school there. Soon after his arrival at Dortrecht he married. His wife died in 1607, after having borne him three children. In about six months he married his second wife, who bore him five sons and two daughters. Of all his children none survived him except his son Isaac. Gerard Vossius was an intimate friend of Hugo Grotius. Grotius had severely chastised the Dutch clergy in his work 'Pietas Ordinum Hollandiae,' and Vossius, although he took the pains to avoid being entangled in the theological disputes then going on in Holland, was suspected of entertaining heretical opinions. In 1614 the professorship of theology at Steinfurt was offered to him, and, owing to the hostility which some of the Dutch clergy evinced towards him, he was inclined to accept the invitation; but at the same time the rectorship of the theological college at Leyden was offered to him. Vossius accepted this distinguished post to which, some years after, the professorship of eloquence and chronology in the university was added. In 1618 he published a history of the Pelagian controversy ('Historia Pelagiana'), from which his enemies inferred that he was guilty of that heresy. A report also was spread that he was an Arminian, and a secret friend of C. Vorstius. All this increased the number and bitterness of his enemies, and the synod of Tergou was prevailed upon, in 1620, to deprive Vossius of the rectorship of the theological college at Leyden. The synod of Rotterdam however restored him, in 1621, to his office, on condition that he should neither say nor write anything against the synod of Dortrecht, which had condemned Arminianism. During these troubles Vossius tranquilly continued his studies and literary labours. In 1624 the university of Cambridge offered him a professorship, but he yielded to the wishes of the curators of the university of Leyden, not to quit the place, and the States of Holland showed him their esteem and confidence by commissioning him to write a Latin and a Greek grammar for the use of the public schools in Holland. In 1626 another unsuccessful attempt was made to get Vossius over to England; but he continued at Leyden, where his lectures and the reputation of his learning attracted crowds of students. The work on Pelagianism, which had called forth so many enemies in Holland, gained him the favour of Archbishop Laud, who procured Vossius a prebend in the cathedral of Canterbury, the emoluments of which were to be transmitted to him at Leyden. In 1629 he came over to England to be installed, and after having been honoured with the degree of doctor of laws at Oxford, he returned to Holland. In 1630 the city of Amsterdam founded a gymnasium, and invited Vossius to the chair of history. Notwithstanding the opposition of the university of Leyden, Vossius accepted the offer, partly because the new office afforded him more leisure, and better opportunity for the education of his children. In 1633 Vossius went to Amsterdam, where he exerted himself to raise the new establishment. Although the successive losses of his children caused him deep and lasting grief, he did not allow these family afflictions to interfere with his official duties or to interrupt his literary activity. He died at Amsterdam in 1649. One day when he was ascending the ladder in his library, the ladder broke, and Vossius was found dead, and buried under his books. Vossius was a man of extraordinary learning, and had a powerful memory; he boasted that he never forgot anything. He was an humble and devout man, and always ready to serve others. He was extremely careful in employing his time, and scarcely ever allowed a friend to stay with him more than a quarter of an hour. He hated nothing more cordially than the theological squabbles and the calumnies with which the scholars of that time assailed one another. His writings, most of which relate to classical antiquity, are very numerous, and some of them necessary to a scholar. They were collected at Amsterdam, 1695-1701, in 6 vols. fol. The following list contains those which are still of great value:—1, 'Aristarchus, sive de Arte Grammaticâ Libri VII.,' Amsterdam, 1635, 4to., and often reprinted; 2, 'De Historicis Latinis Libri Tres,' Leyden, 1627, 4to.; a second edition appeared at Leyden, in 1651. It contains an account of all the writers that ever wrote on historical subjects in the Latin language, down to his own time. 3, 'De Historicis Graecis Libri Tres.' Of this work a most useful edition was published by A. Westermann, Leipzig, 1838, 8vo., which contains many additions and corrections. It gives an account of all the Greek historians down to the taking of Constantinople by the Turks. 4, 'De Veterum Poetarum Temporibus Libri duo qui sunt de Poetis Graecis et Latinis,' Amsterdam, 1652, 4to.; 5, 'De Logices et Rhetoricae Naturâ et Constitutione Libri Duo,' Hagae, 1658, 4to.; 6, 'De Philosophorum Sectis Liber,' Hagae, 1657, 4to.

(Nicéron, *Mémoires des Hommes Illustres*, vol. xiii.; Colomesii *Epistolae G. J. Vossii*, London, 1690.)

VOSSIUS, ISAAC, a son of Gerard Vossius by his second wife, was born at Leyden, in 1618. His education, like that of all his brothers and sisters, was conducted exclusively by his father. After he had completed his studies he travelled for three years through Italy, France, and England, during which time he collected many valuable MSS. of antient writers. Queen Christina invited him in 1648, to Sweden, and Vossius enjoyed for many years her esteem and friendship, and had also the honour of giving her instruction in the Greek language. On his father's death the professorship of history at Amsterdam was offered to him, but he refused it, and although he occasionally visited his native country, yet he spent the greater part of his time in Sweden. Salmasius (Saumaise) was one of the scholars whom Christina drew to her court, and for whom she entertained a very high regard. But Salmasius always treated Vossius in an insolent manner, and when at last the queen was informed that Vossius was going to write against him, she refused to admit him to her presence, whereupon Vossius immediately went back to Holland, in 1658, and never returned to Sweden. In 1663 King Louis XIV. of France sent him a handsome letter, accompanied by a considerable sum of money, partly as an acknowledgment of the great merits of his father Gerard Vossius and partly as an encouragement to Isaac to continue his literary labours. Shortly after this the States of Holland requested Vossius to write a history of the war between England and Holland, and on his refusal, he was deprived of the pension which he had hitherto enjoyed. This appears to have induced him to leave his country, and in 1670 he arrived in England. At Oxford he was made a doctor of laws, and in 1673 King Charles II. made him a canon of Windsor, and assigned to him apartments in the castle, where he remained until his death, on the 10th of February, 1688. The splendid library of books and MSS which he had collected, and which was considered one of the most complete private collections in Europe, was purchased by the university of Leyden.

Isaac Vossius was almost as learned as his father, but his character was not so blameless. When he attended divine service in the chapel at Windsor, it is said that he used to read Ovid's 'Amores' and 'Ars Amandi,' instead of his prayer-book, and he was much given to women. He knew all the European languages without being able to speak one of them correctly. He was familiar with the manners and customs of the antients, but profoundly ignorant of the world and of the affairs of ordinary life. Although a canon of Windsor, he did not believe in the divine origin of the Christian religion, and he treated religious matters with contempt, although in all other things he was exceedingly credulous. Charles II. on one occasion said, 'This learned divine is a strange man: he will believe anything except the Bible.' On his deathbed he refused the sacrament, and was only prevailed upon to take it by the remark of one of his colleagues, that if he would not do it for the love of God, he ought to do it for the honour of the chapter to which he belonged. His literary merits are great, though his works are not so valuable as those of his father. The following list contains his principal works:—1, 'Periplus Scylacis Caryandensis et Anonymi Periplus Ponti Euxini,' with a Latin translation and notes, Amsterdam, 1639, 4to. 2, 'Justinus, Historia Philippica,' with notes, Leyden, 1640, 12mo. 3, 'Ignatii Epistolae, et Barnabae Epistola,' with a Latin translation and notes, Amsterdam, 1646, 4to. 4, 'Pomponius Mela, de Situ Orbis,' Hagae, 1648, 4to.; 5

second edition appeared in 1700, at Franecker. His notes on Mela are chiefly directed against Salmasius. 5, 'Dissertatio de vera Aetate Mundi,' Hagae, 1659, 4to. In this work he endeavours to establish the chronology of the Septuagint in opposition to that of the Hebrew text. This involved him in various disputes with other divines, especially Horne. 6, 'De Septuaginta Interpretibus, eorumque Translatione et Chronologia, Dissertationes,' 1663, 4to. 7, 'De Sibyllinis, aliisque quae Christi Natalem praecessere Oraculis,' Oxford, 1679. 8, 'Catullus, et in eum Isaaci Vossii Observationes,' London, 1684, 4to. 9, 'Variarum Observationum Liber,' London, 1685, 4to. This volume contains a number of dissertations, some of which had been printed separately, but most of them show that he had no critical spirit. 10, 'Observationum ad Pomponium Melam Appendix, &c.,' London, 1686, 4to. This appendix is an attack upon Jacob Gronovius, who had censured Vossius's edition of Mela. Isaac also edited the 'Annales Hollandiae et Zelandiae, Sexcentorum fere Annorum à Theodorico I. usque ad Translatum à Jacobo in Philippum Imperium,' which had been written by his brother Matthias Vossius, who died before the work was completed.

(Nicéron, *Mémoires des Hommes Illustres*, vol. iii.; Andreae, *Bibliotheca Belgica;* Wood, *Athenae Oxonienses.*)

VOTIAKES. [Russian Empire, p. 247.]

VOUET, SIMON, commonly considered the founder of the French school of painting, was born at Paris in 1582. He was instructed by his father Laurent Vouet, a painter of moderate ability, and distinguished himself at a very early age. Baron de Sancy, French ambassador to the Porte, took Vouet with him to Constantinople in 1611, where he painted from memory, after a single interview, an excellent portrait of the Sultan Achmet I. From Constantinople he went to Venice, and from that place, in 1613, to Rome. In Venice he was attracted by the works of Paul Veronese, but in Rome he forsook for a time his style for that of Carravaggio. His reputation procured him a pension from Louis XIII. while he was in Rome, where he was made president of the Academy of St. Luke; and in 1627 Louis recalled him to Paris, gave him the title of principal painter to the king, and apartments in the Louvre. In Paris he had so much to do that he found occupation for a numerous school of young painters, among whom were Le Brun, Le Sueur, Mignard, Du Fresnoy, Testelin, Perrier, the elder Dorigny, and several others. His commissions were so numerous that he was obliged to entrust nearly the entire execution of many of his works to these painters. He painted ceilings, galleries, altarpieces, small religious pieces and other easel pictures, as well as portraits both in oil and in crayons. He painted with great facility in a style peculiar to himself; it was gay, yet feeble in colouring, owing to a want of harmony in the composition of colour: he was mannered likewise in his drawing, especially in the hands and in the heads, which he painted too frequently in profile; he was also deficient in invention and expression, and there is little merit in his compositions. Yet notwithstanding these defects, Vouet greatly improved the French school of painting, and he is allowed by the French historians of art to have done as much for painting as Corneille did for the drama in France. He is however more distinguished for the several excellent painters who were educated by him than for his paintings. He died in Paris in 1641. There are about 200 prints after his works, the principal of which are—the chapel and gallery of the Palais Royal; some works in the Hôtel de Bullion; a ceiling in the Hôtel de Bretonvilliers, &c.; also altarpieces in St. Eustache, St. Nicholas des Champs, St. Merry, and in the chapel of St. François de Paule, Place Royale; there is likewise a good picture by him in the Academy of Painting.

(D'Argenville; Watelet and Levesque; Abbé de Fontenai.)

VOUSSOIR, one of the stones of an arch. [Arch, p. 261.]

VOUZIERS. [Ardennes.]

VOW (from the Latin 'votum,' through the French), a promise to perform some future act, or to pursue some future line of conduct, confirmed by an appeal to the Supreme Being, or at least to some supernatural power, to punish or be propitious to the maker of the promise, according as he breaks or keeps his word. The idolatrous seaman vowed to dedicate some gift to the altar of his divinity if he should escape some impending danger, and the seaman of some Roman Catholic countries still vows in a similar emergency to present a candle or an image to the shrine of his patron saint. The vow in these instances has something of the character of a bargain: a piece of service is asked, and a reward promised in the event of the service being performed. Abraham made his steward swear that he would faithfully discharge the mission to seek out a wife for Isaac: this is an example of the vow which is supposed to bind a man to perform one definite act or incur some supernatural punishment; and the oath taken by witnesses, in courts of justice, at the present day, to speak the truth, belongs to the same class. [Oath.] Some vows again are understood to bind those who make them to the performance of certain limited duties for the whole of their future life—such are the marriage vow, as contemplated by the Church of Rome and the law of England, and the coronation oaths of kings. Some vows are even intended to give a particular form and direction to the whole of a man's future emotions, thoughts, and actions—such are the priestly and monastic vows. The view entertained of the character and operation of a vow has differed materially at different stages of civilization. The vow originated in a religious conception, in the recognition of some unseen power superior to and exercising a control over visible nature and man's destinies. But it originated also in a vague and perhaps unworthy conception of this power, as either having no fixed deliberate purpose of its own or a purpose so wavering and unsettled that men by gifts or flattery might turn it as they wished. As the intellectual and moral faculties of society expanded, men began to entertain more worthy notions of the Divinity. The vow came in consequence to be regarded no longer as a means which could modify or alter the councils of eternal wisdom; but as a solemn form of making a promise, in which the appeal to the Divinity was not understood to have the power of influencing his predetermined councils, but was meant to remind the utterer of the oath of what men are too apt to forget, that the eye of God was upon him, and that his universal and unfailing law punishes crime and falsehood. The operation of a vow is different upon two different classes of minds. To the ignorant and superstitious it affords a motive (their fears) for adhering to a course of action that their fickleness or dishonesty might have tempted them to swerve from. In the more enlightened it awakens a stronger sense of the importance of the act they are about to undertake, renders them more cautious to pledge themselves beforehand, more resolute in performing a promise once made.

The instances in which, in a rude state of society, advantages are derived from vows or promissory oaths administered in the first sense, are perhaps not few in number, but they are still exceptional. The bad influence of the superstitious view of the nature of a vow is permanent: it perverts men's moral opinions by leading them to regard actions as vicious and virtuous, not because of their own inherent character, but because of their being consistent or inconsistent with a promise made beforehand. Men have thus been led to see criminality in the non-performance of a crime they had pledged themselves to commit. The danger with regard to vows, understood in the more rational sense, consists in their too frequent use, or in their employment upon trivial occasions. The public promise of a king ascending the throne to govern with equity—the pledge of man and wife to know one undivided interest till death—the promise to give true and faithful evidence where the property, life, or honour of a fellow-being are at stake—are worthily and usefully accompanied by an appeal to the Divinity, that reminds the makers of these promises of the importance of the engagement they have taken upon them, and brings the religious sentiment to strengthen and confirm the dictates of expediency. But custom-house oaths, masonic vows, and such trivialities and mummeries, degrade the vow to the level of a mere theatrical show, or of the thoughtless habit of interjectional swearing in common discourse. The addition of a vow does not render a promise more binding, or alter the reason why it is binding. A promise affords a ground of belief that a man will act in a certain pre-determined manner, instead of being carried away by the whim of the moment. It is of advantage to the individual who makes promises that he should, except in extreme cases, contract the habit of adhering to them, because it imparts consistency and power to his character; and it is of advantage to all with whom he may have dealings that he should contract this habit, for it renders their transactions with him safe. Hence the universal feeling that, except in very extreme cases, promises ought to be kept, even to the maker's disadvantage. Vows are exactly on the same footing: the superadded appeal to the Divinity is merely of use in so far as by its solemnity it renders men more cautious in binding themselves, and more earnest and unwavering in the performance of their promise. The danger of making vows frequently and on trivial occasions has been inferred from the nature of the religious sentiment called into play: a further restriction of their admissibility may be deduced from the nature of the simple promise. It limits man's freedom of action, and so far is a disadvantage. It ought to be confined to actions: for a man to pledge himself to feel and think only in a certain manner is to undertake an impossibility. It pledges him to an unhealthy life-long struggle against the order of nature. The promise ought moreover to be restricted to actions meritorious in themselves, and of some consequence. If to commit a crime is bad, to promise to commit one, and deliberately to keep the promise when aware of the criminality of the act, is worse. To tie a man's self up by a promise from the commission of an action indifferent in itself is a wilful waste of the power of self-denial, of which man at the best has no more than barely serves his necessities: the mind worn out with struggling against harmless propensities falls an easy prey to temptation in more important matters. The whole history of the monastic orders, a history attractive from the grandeur of its irregular and imaginative struggles, is an illustration of these views. With regard to simple promises, the rule of action is to make as few as possible, and exert every effort to keep them, unless convinced that to do so would be a crime. With regard to vows, the same rule holds if possible with more force, because fickleness in regard to them implies a profane trifling with the most sublime emotions of our nature.

VOWEL. [ALPHABET.]

VRIES, JOHN, or HANS FREDEMAN DE, a Dutch architectural and perspective painter, born in 1527, at Leeuwaarden in Friesland. He was bound for five years at Leeuwaarden, to a painter of Amsterdam, of the name of Gerritsz, and designed becoming a glass-painter. He painted some time at Mechlin, and settled for a time at Antwerp, where, in 1549, he was employed with other painters to paint the triumphal arches erected in honour of the entry of Charles V. and his son Philip. He afterwards visited many cities of Germany, in all of which he added to his reputation by his works. De Vries was a complete master of perspective; he published a treatise upon the science, which was afterwards enlarged by Samuel Marolois. His paintings, large and small, are very true; they consist of gardens, exteriors and interiors of buildings; and some of them are embellished with figures by other masters. His drawings and designs were very numerous. There have been published twenty-six books of prints by him, illustrating various styles of architecture, with views of buildings, villas, &c. He was a great admirer of the works of Vitruvius and Serlio, which he studied in the Flemish translations of Peter Koek. Hans had two sons, Paul and Solomon de Vries, who painted in the same style as their father; but though well, with less success. Solomon died in the Hague in 1604, before his father, the date of whose death is not known; the date 1588, in Pilkington's 'Dictionary' (ed. 1829), is an error. Paul executed some extensive works at Prague. When he died is also unknown; he was living at Amsterdam in 1604, according to Van Mander; the date therefore of 1598, given in Pilkington's 'Dictionary' as the year of his death, is also an error.

Hans de Vries is called sometimes Frisius. There is a portrait of him in Van Mander's work *Leven der Schilders, &c.*

VRIES, MARTIN GERRITZON, a Dutch navigator of the 17th century. In 1643, Van Diemen, at that time governor-general of the Dutch possessions in India, gave him the command of an expedition destined to examine the countries north of Japan, and the west coast of Tartary as far north as the 56th degree of latitude. Vries hoisted his flag on board the Kastricum, and had under him Henrik Corneliszen Schaep, in command of the Breskens. The two vessels sailed from Batavia on the 3rd of February, 1643. They were separated on the 26th of May in a storm off Niphon, and did not meet again till September. During the interim, the Kastricum partially examined the islands in the vicinity of Perouse's Straits, and some were accurately delineated by that navigator and Krusenstern. When Vries rejoined the Breskens, he found the captain and part of the crew had been imprisoned by the Japanese, on a suspicion of their having smuggled some Portuguese priests into the island. The prisoners were not released till the 24th of July, 1644. A brief account of the voyage of Vries was published at Amsterdam in 1646. Thevenot inserted an abstract of it in his collection of voyages; the instructions given to Vries have been printed in the ninth volume of the 'Philosophical Transactions.' D'Anville corrected a part of the coast-line of the Jesuits' map of China from a large MS. chart of the track of the Kastricum which came into his hands. A copy of part of this chart on a reduced scale was published in the account of La Perouse's voyage. Both Krusenstern and La Perouse speak with great respect of Vries's talents as a navigator; his astronomical observations are wonderfully accurate, considering the state of instruments in his time. The narrative of his voyage contains some graphic details respecting the appearance of the country he visited and the customs of the inhabitants. Buache, who was not acquainted with the Dutch language, calls Vries by mistake Uries, and the error has been perpetuated in the Voyage of La Perouse. Of the history of Vries, prior and subsequently to his voyage, nothing appears to be known.

VULCAN (Latin, 'Vulcánus;' Greek, 'Hephaestus,' Ἥφαιστος), the god of fire, especially so far as it manifests itself as one of the elementary powers of nature in volcanic districts, and so far as it is an indispensable means for the working in metal and prosecuting the pursuits of industry in general. The name Vulcanus therefore probably contains the same element (fulg) as 'fulgere,' 'fulgur,' and 'fulmen.' According to Homer, he was the son of Zeus (Jupiter) and Hera (Juno), and was from his birth so weakly and ugly, that his mother, wishing to get rid of him, dropped him from Olympus. But Thetis and Eurynome, two marine divinities, received him falling, and with them he dwelled concealed for nine years, during which period he made various beautiful ornaments for the two goddesses. Whenever he remembered the cruel act of his mother, he felt indignant at her shameful treatment, but otherwise he was kind and obedient to her, and on one occasion when he took her part against his father, Zeus seized him by the foot and hurled him from Olympus. He fell for a whole day, and came down on the island of Lemnos, where he was kindly received by the Sintians. He afterwards returned to Olympus, where he inhabited a palace built by himself. Here he had his workshop with its anvil and twenty bellows which worked at his bidding, and he produced the most exquisite specimens of art both for gods and men. His wife is called in the 'Iliad' Charis, but in the 'Odyssey' it is Aphrodite (Venus), who however is faithless to him. She favoured Ares (Mars), and Vulcan being informed of it by Helios (the Sun), caught the lovers together in a net, and called all the gods together to witness the spectacle. At the request of Poseidon (Neptune) however he liberated them. In the Trojan war Vulcan sided with the Greeks, though he had a temple and priests at Troy also. This is an outline of the story of Vulcan, as far as it can be gathered from the Homeric poems. Other traditions mentioned by later writers state that he had no father, and that he was born of Hera without her having had any connection with a god or male being, in the same manner as Zeus gave birth to Athena (Minerva). Others called Vulcan a son of Talus, Coelus, Nilus, or Menanus, but these are foreign traditions transferred into Greece. Some legends describe Vulcan as having become lame from his fall from Olympus upon the island of Lemnos, whereas according to *Homer* he was weak and lame from his birth. According to Virgil and others, Vulcan does not produce his wonderful works of art alone, but is assisted by the Cyclopes, and his workshop is not in Olympus, but in some volcanic island. His favourite island was Lemnos, but other volcanic islands also, such as Lipara, Hiera, Imbros, and Mount Ætna in Sicily, are described as places in which Vulcan lived and worked. The antient epic poets abound in descriptions of wondrous works of art said to have been made by Vulcan. Like Athena, he is the divinity that gives skill to mortals, and teaches them the arts which gladden and adorn human life. That both divinities were looked upon as somewhat akin to each other, is clear not only from several legends, but also from the fact that at Athens they had common festivals and temples. The festivals celebrated at Athens in his honour were the Hephaestia and Chalcia, the former of which was particularly splendid on account of the torch races (lampadephoria).

The worship of Vulcan seems to belong to the oldest religious institutions of the antient world, and undoubtedly arose from the worship of fire, so common among uncivilized nations and in the East. Later poets therefore, in applying the name of Vulcan or Hephaestus to fire in general, returned in some manner to the original idea of the god. In Samothrace, where remnants of the antient Pelasgian religion continued to exist long after the introduction of the Hellenic religion into Greece, Vulcan was the first among the Cabiri. In Etruria he was one of the twelve great national gods; and we find his worship established at Rome from the earliest times. A temple of Vulcan, situated close by the Comitium, is mentioned as early as the reign of Romulus and Tatius, and from the stories and rites connected with his worship at Rome, we must infer that his temple was viewed in a similar light to that of Vesta, that is, as a place of union, or the central point of the state. The Fornacalia (from *fornax*, a furnace), which festival was celebrated at Rome on the 17th of February, was probably an antient festival of Vulcan; his great festival however, which was celebrated every year on the 23rd of August, with games in the Circus Flaminius, was in later times the great festival of the god. The Romans often dedicated to him the arms taken from an enemy: they were piled up and burnt. The Romans frequently designate Vulcan by the name Mulciber, which seems to have been given to him as a propitiating name, that he might not destroy the habitations and property of men by fire, but that he might be a beneficent and mild god, using his powers only to serve the human race. Vulcan was not unfrequently represented in works of art, the most antient of which seem to have been the dwarfish figures which were placed in private houses near the hearth. His most celebrated statue was that by Alcamenes at Athens, representing the god in a standing position, and slightly indicating his lameness. His attributes are the instruments of the art of working in metal, as the hammer and the like, the Samothracian oval cap, and the chiton which leaves the right shoulder and arm uncovered.

(Jacobi, *Handwörterbuch der Griechisch. und Röm. Mythologie*, under 'Hephaestus;' Hartung, *Die Religion der Römer*, ii., p. 106, &c.; Hirt, *Mythologisches Bilderbuch*, p. 42, &c.)

VULCA'NO. [LIPARI ISLANDS.]

VULGATE. The Vulgate (*Vulgata versio*), or common version, is the name sometimes given by St. Jerome to what he elsewhere calls the *Vetus*, or antient version, and what St. Augustine calls the *Vetus Itala*, or Old Italian Version, being the most generally received of those early Latin translations of the Scriptures distinguished by biblical critics as the ante-Hieronymian, al. which are now lost, with the exception of some parts of this *Vetus Itala*, and such fragments of the others as are quoted in the writings of the Fathers. Jerome's first labours as a translator of the Scriptures consisted in a revision and correction of this original Vulgate, which he completed about A.D. 390. Before this date however he had commenced an entirely new translation from the original Greek and Hebrew; and it is this to which the name of the Vulgate is now given. The earlier Vulgate, as revised by Jerome, has all perished, except only the Book of Psalms and the Book of Job, and the apocryphal Books of Maccabees, Baruch, Ecclesiasticus, and Wisdom. The use of Jerome's new version appears to have been gradually introduced; but ever since the seventh century, when it was sanctioned by Pope Gregory I., it has been exclusively adopted by the Romish church. The Council of Trent, in the sixteenth century, even conferred upon it an authority superior to that of the original texts, by ordaining that 'the Vulgate alone should be esteemed authentic in the public reading of the Scriptures, in disputations, in preaching, and in expounding, and that no one should dare to reject it under any pretext whatever.' Accordingly all the Romish translations of the Bible into the modern languages profess to have been made not from the Greek and Hebrew, but from the Vulgate.

The true text of Jerome's version however has been at all times matter of doubt and controversy. It very early got mixed with that of the *Vetus Itala*; and the restoration of its purity employed the labours of Alcuin, by direction of Charlemagne, towards the close of the eighth century; of Lanfranc, archbishop of Canterbury, in the eleventh; of Cardinal Nicholas and others, in the twelfth and thirteenth. After the invention of printing, the Latin Bible was the first considerable work that was sent to the press; but the earliest editions exhibited a very corrupt text. The first critical editions were those produced at Paris, by Robert Stephens (Etienne), in 1528, 1532, 1534, 1540, 1545, and 1546. Of these the edition of 1540 is accounted the best. Other corrected editions are those of John Hentenius, a divine of Louvain, first printed at Louvain, in folio, in 1547, reprinted by the Plantins, at Antwerp, in 5 vols. 8vo., 1565 and 1574; and that of Lucas Brugensis, and other divines of Louvain, printed at Louvain, in 3 vols. 8vo., in 1573; and again, both in 8vo. and 4to., in 1586.

The first revised edition of the Vulgate promulgated by authority in the Romish church was issued at Rome from the press of the Vatican, in three volumes, folio, in 1590, under the title of 'Biblia Sacra Latina, Vulgatae editionis, jussu Sixti V. recognita et edita.' This edition, the preparation of which had been begun under Pius IV., was declared by Pope Sixtus to be the authentic text, and is known as the Sixtine Vulgate, or the Bible of Sixtus V. Yet it had been no sooner published than it was discovered to be full of misprints and other errors, which were very insufficiently corrected by the necessary emendations, printed upon separate strips of paper, being here and there stuck over the original word where the passage had been most grossly disfigured. Gregory XIV., who succeeded Sixtus V., ordered it to be suppressed, and the true Sixtine Vulgate is now of excessive rarity. A new edition of it, in the same form, was brought out in 1592, under the authority of Gregory's successor Clement VIII., and this is called the Clementine Vulgate, or more frequently by Roman Catholic writers the corrected Bible of Sixtus V. It is now the authorized edition in the Romish church; the Vulgate as since printed being commonly entitled 'Biblia Sacra Latina, Vulgatae editionis Sixti V. et Clementis VIII.' Protestant controversialists have, naturally enough, made the most of the variations to be found between the Sixtine and Clementine Vulgates, each published and declared to be the only true edition by an authority professing to be infallible.

(Horne's *Introduction to the Study of the Holy Scriptures*, 8th edition, vol. ii., part i., pp. 234-240; De Bure, *Bibliographie Instructive*, i., 32-69.)

VULPE'CULA ET ANSER (the Fox and the Goose), a constellation of Hevelius, situated immediately above Aquila and Sagitta. The principal stars are as follows:—

Character. Name in Bayer.	No. in Catalogue of		Magnitude.	Character. Name in Bayer.	No. in Catalogue of		Magnitude.
	Flamsteed. Piazzi ( ).	Astron. Society.			Flamsteed. Piazzi ( ). Bradley [ ].	Astron. Society.	
	1	2235	5	*l*	21	2383	5½
	3	2259	6	*m*	22	2385	5
	4	2269	6	*n*	23	2389	4½
b	6	2277	4	*o*	24	2392	5
	8	2279	6		25	2400	6
	9	2292	6	*p*	27	2431	5
d	10	2314	6		28	2438	6
e	12	2332	5	*s*	29	2436	5
	13	2338	4½		30	2447	6
f	14	2350	5	*r*	31	2473	6
g	15	2357	4½	*q*	32	2478	5
h	16	2359	5	*x*	33	2488	6
i	17	2370	4½		(163)	2283	6
	18	2377	5½		[2510]	2315	6
	19	2379	6		[2559]	2358	5
k	20	2380	5½				

VULPES. [Fox.]

VULPILIN, or VULPINIC ACID. This substance is obtained from *evernia vulpina* of Achard, or the *lichen vulpinus* of Linnæus.

The properties of this body are, that it has the form of rectangular prisms, which are of a fine yellow colour; it is transparent, not altered by exposure to the air, melting when heated and reassumes the crystalline state on cooling. It is little soluble in cold, but very soluble in boiling water, and in hot alcohol and æther. It may be volatilized without decomposition, and it is not affected either by concentrated nitric, hydrochloric, or sulphuric acid. It is stated that it reddens vegetable blues, and is therefore considered as an acid, and this property is further evinced by its combining with ammonia to form a salt. It does not appear to have been analyzed.

VULSELLA. [MALLEACEA; MARGARITACEA.]

VULTURE. [VULTURIDÆ.]

VULTU'RIDÆ, a family of Raptorial Birds [RAPTORES], whose geographical distribution is confined to warm climates, where they act as scavengers to purify the earth from the putrid carcasses with which it would otherwise be encumbered.

It has been matter of dispute whether they are directed to their fetid food, for they seldom prey on living animals, by the eye or by the nasal organ, and this controversy is noticed in the articles BIRDS (vol. iv., p. 429); TURKEY BUZZARD; and CONDOR. There can however in our opinion be little doubt that both the senses are made to contribute to the discovery of the carcass. The lofty flight and telescopic eye are well adapted to detect any dying or dead animal, and, as the action of one vulture may be, in all probability is, watched by another, a sort of telegraphic communication as to the position of the object is kept up. Among late writers we know of none who has more accurately or graphically recorded his observations on the habits of this unclean but useful group than Mr. Darwin. These observations may, we know, be safely depended on; and we proceed to lay before our readers his highly interesting remarks upon the Condor, which were not published till after the appearance of our article on that bird.

In Patagonia, Mr. Darwin, on the 27th of April, 1834, shot a Condor which measured from tip to tip of the wings, eight and a half feet, and from beak to tail four feet. 'It is,' says he, 'a magnificent spectacle to behold several of these great birds seated on the edge of some steep precipice.' He then describes all he had observed of the habits of this enormous vulture.

The geographical range of the species, according to Mr. Darwin, is wide, for it is found on the west coast of South America, from the strait of Magalhaens throughout the entire range of the Cordillera. On the Patagonian shore, the steep cliff near the mouth of the Rio Negro, in lat. 41°, was the most northern point where he saw these birds, or heard of their existence, and there, he observes, they have wandered about four hundred miles from the great central line of their habitation in the Andes. Farther south, among the bold precipices which form the head of Port Desire, they were not uncommon; but, he adds, that only a few stragglers occasionally visit the sea-coast. A line of cliff near the mouth of the Santa Cruz was frequented by those birds, and about eighty miles up the river, where first the sides of the valley were formed by steep basaltic precipices, they again appeared, although in the intermediate space not one had been seen. From these and similar facts, the presence of the bird seemed to Mr. Darwin chiefly to be determined by the occurrence of perpendicular cliffs. In Patagonia the Condors slept and bred either in pairs or many together on the same overhanging ledges. In Chile, he tells us, during the greater part of the year, they haunt the lower country near the shores of the Pacific, and, at night, several roost in one tree; but in early summer they retire to the most inaccessible parts of the inner Cordillera, there to breed in peace.

With respect to their propagation, Mr. Darwin was told by the country-people in Chile, that the Condor makes no sort of nest, but, in the months of November and December, lays two large white eggs on a shelf of bare rock. On the Patagonian coast he could not see any sort of nest among the cliffs, where the young ones were standing, and he adds, that it is said that the young Condors cannot fly for an entire year. At Concepcion, on the 5th of March (corresponding to our September), he saw a young bird, which, though in size little inferior to an old one, was completely covered by down like that of a gosling, but of a blackish colour; and he felt sure that it could not be able to use its wings for many months. But, the bird may be seen hunting for itself before the ruff round its neck is turned white; and Mr. Darwin further relates that, at the mouth of the Santa Cruz, during part of April and May, a pair of old birds might be seen every day, either perched on a certain ledge, or sailing about in company with a single one, which, though full fledged, had not its ruff white. He thinks, especially when recollecting the state in which the Concepcion bird was on the previous month, that this young Condor had not been hatched from an egg of that summer. As there were no other young birds, it seems probable to him that the Condor only lays once in two years.

The same observing author states that these birds, generally, live in pairs; but among the inland basaltic cliffs of the Santa Cruz, he found a spot where scores most usually haunted. 'On coming suddenly to the brow of the precipice, it was a fine sight to see between twenty and thirty of these great birds start heavily from their resting-place, and wheel away in majestic circles.' From the quantity of dung on the rocks, Mr. Darwin concludes that they must long have frequented this cliff, and that, probably, they both roost and breed there. Having gorged themselves with carrion on the plains below, they retire, he says, to these favourite ledges to digest their food. From these facts he also concludes that the Condor must to a certain degree be considered, like the Gallinazo, a gregarious bird. In this part of the country, Mr. Darwin states that they live altogether on the Guanacoes, which either have died a natural death, or, as more commonly happens, have been killed by the Pumas. He believes, from what he saw in Patagonia, that the Condors do not, on ordinary occasions, extend their daily excursions to any great distance from their regular sleeping-places.

'The Condors,' says Mr. Darwin in continuation, 'may oftentimes be seen at a great height soaring over a certain spot in the most graceful spires and circles. On some occasions I am sure that they do this for sport, but, on others, the Chileno countrymen tell you that they are watching a dying animal, or the Puma devouring its prey. If the Condors glide down, and then suddenly all rise together, the Chileno knows that it is the Puma which, watching the carcass, has sprung out to drive away the robbers. Besides feeding on carrion, the Condors will frequently attack young goats and lambs. Hence the shepherd dogs are trained, the moment the enemy passes over, to run out, and, looking upwards, to bark violently. The Chilenos destroy and catch numbers. Two methods are used: one is to place a carcass within an enclosure of sticks on a level piece of ground, and when the Condors are gorged, to gallop up on horseback to the entrance, and thus enclose them: for, when this bird has not space to run, it cannot give its body sufficient momentum to rise from the ground. The second method is to mark the trees in which, frequently to the number of five or six, they roost together, and then, at night, to climb up and noose them. They are such heavy sleepers, as I have myself witnessed, that this is not a difficult task. At Valparaiso, I have seen a living Condor sold for sixpence, but the common price is eight or ten shillings. One which I saw brought in, had been lashed with rope, and was much injured; yet the moment the line was cut by which its bill was secured, although surrounded by people, it began ravenously to tear a piece of carrion. In a garden at the same place, between twenty and thirty were kept alive. They were fed only once a week, but they appeared in pretty good health. The Chileno countrymen assert that the Condor will live and retain its powers between five and six weeks without eating. I cannot answer for the truth of this, but it is a cruel experiment, which very likely has been tried.'

Mr. Darwin noticed that several hours before any of the Condors died, all the lice with which they are infested crawled to the outside of the feathers; and he was told that this was always the case.

With reference to the question whether sight or smell directs the Vultures to their food, Mr. Darwin remarks that when an animal is killed, it is well known that the Condors, like other carrion-vultures, soon gain intelligence of it, and congregate in an inexplicable manner. In most cases it must not, he observes, be overlooked, that the birds have discovered their prey, and have picked the eleton clean before the flesh is in the least tainted. He ed, in the garden mentioned in the last paragraph but e, the following experiment:—The Condors were tied ch by a rope, in a long row at the bottom of a wall. aving folded up a piece of meat in white paper, he lked backwards and forwards, carrying it in his hand at e distance of about three yards; but no notice whatever s taken. He then threw it on the ground within one rd of an old cock bird, which looked at it for a moment th attention, but then regarded it no more. With a ek Mr. Darwin pushed it closer and closer, until at last e Condor touched it with his beak: the paper was then stantly torn off with fury, and at the same moment every rd in the long row began struggling and flapping its ings. Mr. Darwin observes, that under the same circum- ances it would not have been possible to have deceived dog. Although he refers however to Mr. Audubon's inions as to the small power of smelling in vultures, he lmits, after noticing Professor Owen's dissection, that the cts related by Mr. Sells, and stated, together with Mr. wen's account, in our article on the *Turkey Buzzard*, are onclusive as to the birds having obtained the intelligence death by the sense of smell alone; and he comes to the onclusion, from the various facts recorded, that carrion- eding hawks possess both the sense of sight and smell in n eminent degree.

With regard to the telegraphing above alluded to, and e probable powers of the eye of the Vultures, Mr. Darwin elates that often, when lying down to rest on the open lains and looking upwards, he has seen carrion-hawks ailing through the air at a great height. Where the ountry is level, he expresses his belief that a space of the eavens of not more than 15° above the horizon is commonly viewed with any attention by a person either walk- ng or on horseback. If such be the case, and the Vulture e on the wing at a height of between three and four housand feet, before it could come within the above range f vision, its distance in a straight line from the beholder's ye would be rather more, he observes, than two British miles: and he asks whether the bird might not thus be eadily overlooked? When an animal is killed by the sportsman in a lonely valley, may not that sportsman, he gain asks, all the while be watched from above by the harp-sighted bird? And will not the manner of its descent proclaim throughout the district to the whole family f carrion-feeders that their prey is at hand?

The grand and graceful flight of one of the largest of the Raptorial birds is thus graphically placed before the mind's eye by this painter with the pen:—

'When the Condors in a flock are wheeling round and round any spot, their flight is beautiful. Except when rising from the ground, I do not recollect ever having seen one of these birds flap its wings. Near Lima, I watched several for nearly half an hour, without once taking off my eyes. They moved in large curves, sweeping in circles, descending and ascending without once flapping. As they glided close over my head, I intently watched from an oblique position the outlines of the separate and terminal feathers of the wing; if there had been the least vibratory movement, these would have been blended together, but they were seen distinct against the blue sky. The head and neck were moved frequently, and apparently with force; and it appeared as if the extended wings formed the fulcrum on which the movements of the neck, body, and tail acted. If the bird wished to descend, the wings were for a moment collapsed; and then, when again expanded with an altered inclination, the momentum gained by the rapid descent seemed to urge the bird upwards, with the even and steady movement of a paper kite. In the case of any bird *soaring*, its motion must be sufficiently rapid, so that the action of the inclined surface of its body on the atmosphere may counterbalance its gravity. The force to keep up the momentum of a body moving in a horizontal plane in that fluid (in which there is so little friction) cannot be great; and this force is all that is wanted. The movement of the neck and body of the Condor, we must suppose, is sufficient for this. However this may be, it is truly wonderful and beautiful to see so great a bird, hour after hour, without any apparent exertion, wheeling and gliding over mountain and river.' (Darwin, *Journal*, 1839.)

The bill of the Vulture is admirably formed for dissecting and tearing out its food. The preparation, No. 309, in the 'Physiological Series' of the museum of the Royal College of Surgeons in London, displays the head of the King of the Vultures (*Vultur papa*, Linn.; *Sarcoramphus papa*, Auct.), showing a beak fitted by its strength, sharpness, and hooked form to tear the flesh of animals. No. 1485 of the same series exhibits the tongue and larynx of the same vulture, showing the series of small retroverted spines along the lateral margins of the tongue, of which the sides are raised so as to render the dorsum concave.

Head of Griffon Vulture.

SYSTEMATIC ARRANGEMENT.

The genus *Vultur* of Linnæus stands first in his first order, *Accipitres*, and consists of the following species:—*gryphus*, *harpyja*, *papa*, *monachus*, *aura*, *barbatus*, *percnopterus*, and *albicilla*. (*Syst. Nat.*, ed. 12.)

In Latham's system the genus occupies the same position.

In the method of M. de Lacépède the birds of prey form the seventh order, and are placed under the first subdivision (with strong and very crooked talons) of his second division of his first subclass of birds, viz. those with three toes anteriorly, and one toe or none posteriorly. *Vultur*, the thirteenth genus in his arrangement, is the first of this order, and is immediately followed by *Gypaëtos*.

M. Duméril's first order is formed by the Rapacious Birds (*Rapaces*), and the first family of this order consists of the *Nudicolles* or *Ptilodères*, which comprise the genera *Sarcoramphus* and *Vultur*. The second family, the *Plumicolles* or *Cruphodères*, comprise the Griffon, the Kite, the Eagle, &c.

Illiger makes the RAPTATORES his third order.

The Vultures (*Vautours*, *Vultur*, Linn.) form the first great genus of the Diurnal Birds of Prey of Cuvier, who remarks that Linnæus divided those birds into two very natural divisions, the Vultures and the Falcons, a division followed by Cuvier himself, who says of the Vultures that their eyes are placed *à fleur de tête*, and that their tarsi are reticulated, that is to say, covered with small scales; their bill is elongated, curved only at the end, and a more or less considerable part of the head, or even of the neck, is denuded of feathers. The power of their talons, he observes, does not correspond to their size, and they make use of their bill rather than their claws. Their wings are so long, that in walking they carry them half extended. They are, he says, a cowardly race, and feed more frequently on carrion than living prey. When they have finished their repast, their crop forms a great projection above the fork-like bone, a fetid humour distils from their nostrils, and they are reduced almost to a state of stupidity.

Cuvier divides this great genus into the following subgenera:—

The Vultures properly so called, *Vultur*, Cuv.

These have a large and strong beak, with the nostrils placed diagonally at its base; the head and the neck without feathers and without caruncles; a collar of long feathers or of down at the bottom of the neck.

Locality.—The antient Continent.

Example, *Vultur fulvus*, &c.

Sarcoramphus, Duméril.

America, Cuvier remarks, produces Vultures remarkable for the caruncles which surmount the membrane of the base of their beak, which is as large as that of the preceding genus, but the nostrils are oval and longitudinal. These are the *Sarcoramphi* of Duméril.

Example, *Sarcoramphus papa*.

Cathartes, Cuv. (*Gallinazos* or *Catharistes*, Veill.)

These have the beak of the *Sarcoramphi*, that is to say, it is stout, and the nostrils are oval and longitudinal; but there is no fleshy crest, although their head and neck are plumeless.

Example, *Cathartes californianus*, &c.

Percnopterus, Cuv. (*Gypaëtos*, Bechst.; *Neophron*, Sav.)

The bill in this group is slender, long, a little convex above its curvature, the nostrils oval and longitudinal, and the head, but not the neck, denuded of feathers. These are birds of moderate size, and which do not approach the Vultures properly so called in extent of power: they are therefore more ravenous after carrion and all kinds of impurities which attract them from afar: even excrements are palatable to this filthy race. Illiger comprises both this and the preceding subgenera under his *Cathartes*.

Example, *Percnopterus Ægyptiacus*, *Neophron percnopterus*, Sav.

Under this subgenus Cuvier places the *Urubu*, *Vultur Iota*, C. Bonap., of America.

The Griffons. (*Gypaëtos*, Storr; *Phene*, Sav.)

These, Cuvier observes, are arranged by Gmelin under the genus *Falco*, but approximate more closely to the Vultures in their habits and conformation. Their eyes are placed *à fleur de tête*, their claws are proportionally weak, their wings are half opened in their state of repose, their crop projects from the bottom of the neck when it is full, but their head is entirely covered with feathers. Their distinguishing characters consist of a very strong beak, which is straight, hooked at the point, and convex at the hooked part, of nostrils covered with stiff bristles directed forwards, and a pencil of similar bristles under the beak. Their tarsi are short and feathered down to the toes; their wings are long, and the third quill is the longest.

Example, *Gypaëtos barbatus*.

Vieillot's order *Accipitres* stands first in his arrangement. His first family (*Vautourins*), containing the Vultures generally, and the Caracara, is immediately succeeded by the family of *Gypaëtes*, consisting of the genus *Phene* only.

The *Rapaces* form M. Temminck's first order of birds, and comprise the genera *Vultur*, *Cathartes*, *Milvus*, *Falco*, and *Strix*.

'If,' says Mr. Vigors, in his paper on the *Natural Affinities that connect the Orders and Families of Birds*, 'we admit the GYPOGERANUS among the *Raptores*, we may arrange it, I conceive, next the Vultures, to which family it bears a nearer affinity than the *Falconidæ*, in its naked cheeks and the looseness of the plumage about the head. The construction of the feet, also, brings it more close to the Vultures, while the comparative straightness and bluntness of its toes distinguish them from the hooked and pointed talons of the Falcons. The greater development of the membrane which connects the toes affords an additional reason for placing it near the *Vulturidæ*. Its natural station therefore appears to be immediately preceding this family, from which indeed it seems only to deviate in the length of its tarsi and its reptile food.

'Passing on now to the succeeding families of the order,—the affinity between the *Vulturidæ* and *Falconidæ* may with equal confidence be asserted, from the circumstance of several species of each being indiscriminately arranged in both families by different systematic writers. The external characters of these neighbouring groups are indeed considerably blended together. The long bills of the Vultures, straight at the base and hooked only at the point, pass over into many groups of the *Falconidæ*; while some species of the latter family, which from their manners cannot be separated from it, exhibit the naked face and loose plumage that characterize the Vultures. Of this, the *Falco Novæ Zealandiæ* of Dr. Latham affords a notable instance; and more particularly his *Falco Braziliensis*, another of the fishing Eagles, forming the genus *Polyborus* of M. Vieillot, where the throat is devoid of feathers, as well as the cheeks. The genus *Gypaëtos* of Storr, of which the *bearded Vulture* of the Alps presents the type, appears to form the connecting link between the families. Here, not merely the details of the bird's structure partially correspond with those of the conterminous groups, but in manners also it agrees with each: the bird being occasionally observed, like the *Vultures*, to feed upon carrion, and at other times, like the *Falcons*, to pursue a living prey.' (*Linn. Trans.*)

In the second volume of the *Zoological Journal* Mr. Vigors observes, that if we fix our attention on the distinguishing characters of the Vultures, and at the same time take into consideration the size and strength and consequent powers of body that separate the Vultures from other groups in ornithology, we may at once determine that the birds in which these characters are most strongly conspicuous, will form the typical group of the family. These species therefore, he remarks, may be selected as forming the *Normal group* of the *Vulturidæ*, in which the powers of the bill and legs are most apparent, the head and neck most devoid of feathers, and the organs of smell most fully developed. This group, he observes, will be found chiefly to inhabit the torrid regions, and their food to be, almost exclusively, carrion, which they prey upon for the most part in large flocks. On the other hand, the *Aberrant group* will comprise those birds which exhibit a comparative weakness in the bill and legs, a less extension of the organs of smell, and a smaller portion of the head and neck devoid of plumage; or where, although some degree of the size and strength of the more typical birds is preserved, the greater part of the head and neck is covered with feathers. This group, Mr. Vigors adds, may be observed to spread itself over the higher and colder latitudes more extensively than the typical *Vultures*, and to seek occasionally a living prey, which they frequently pursue either singly or by pairs. Here follows his proposed arrangement.

§ Normal group. *General conformation powerful: head and neck bare of feathers; organs of smell strongly developed.*

Genera:—*Sarcoramphus*, Dum.; *Vultur*, Auct.

§ Aberrant group. *General conformation weaker: head and neck less bare of feathers; organs of smell less developed.*

Genera:—*Gypaëtus*, Storr; *Neophron*, Sav.; *Cathartes*, Ill.

M. Latreille makes the Vultures (*Vautourins*) his first family of his first tribe (*Diurnes*) of his first order *Rapaces*, and includes under it the genera *Sarcoramphus*, *Vultur*, *Percnopterus*, and *Gypaëtus*.

Mr. Swainson, in his 'Classification of Birds,' observes that in such tribes as feed upon carrion or small animals the tooth on the bill, which marks the diurnal bird of prey that attacks the living, being no longer essential, is either obsolete or entirely wanting. 'The slothful vulture and the cowardly hyæna glut themselves upon carrion: the bold and majestic lions, like the noble falcons, feast upon no other prey than what their own courage has procured: while the owls and the stoats prowl during the night after the same feeble and ignoble game.' Of the *Vulturidæ* Mr. Swainson says that the filthiness of their food imparts to their whole body a fetid odour, which nature has rendered a means of defence; for, if seized during the torpid inactivity which succeeds their meals, they immediately disgorge the nauseous contents of their stomach over the luckless captor, who is thus, by a sudden impulse of loathing, obliged to relinquish his hold. But, he adds, that those parts of the bird which come in contact with its offensive food should not be soiled and matted together, the whole of the head (and frequently a great part of the neck) is entirely destitute of feathers; while those on the rest of the body have a certain elasticity and glossiness which enables the bird, by a few sudden shakes, to cleanse itself at once from any fragments that remain upon the plumage.

'The vultures,' says Mr. Swainson in continuation, 'are the great scavengers of nature in hot latitudes, where putrefaction is most rapid, and most injurious to health: and the disposition of their numbers is regulated by an all-wise Creator according to their usefulness. They are sparingly scattered over the south of Europe: in Egypt they are more numerous; but in tropical America, although the species are fewer, the individuals are much more plentiful. No sooner is an animal dead than its carcass is surrounded by numbers of these birds, who suddenly appear, coming from all quarters, in situations where not one had just before been seen. The nakedness of the head, and frequently of the neck, is most apparent in those whose geographic range is limited to the New World, at the head of which division stand two remarkable species, the celebrated Condor of the Andes, and the *Papa*, or King Vulture, of the Brazilian forests. The first is well known for the loftiness of its flight and its amazing strength, while the latter is the only species whose colouring is not dark or sombre.'

The following is Mr. Swainson's arrangement:—

Order 1. Raptores. *Rapacious Birds.*

Family Vulturidæ. *The Vultures.*

Size large. Body thick, heavy. Bill and legs very strong; the former hooked, but not toothed. Claws but slightly curved, and hardly retractile. Head and neck in general more or less naked.

Genera and Subgenera:—Genus *Vultur*, Linn. Nostrils naked, transverse. Wings with the fourth quill longest. Head and bill destitute of caruncles. Tail-feathers 12-14. Inhabits the Old World.

Example, *Vultur fulvus.*

Genus *Cathartes*, Ill. Nostrils naked, longitudinal. Wings with the third quill equal to the fourth, and longest. Inhabits, with one exception, the New World. Typical.

Under the genus *Cathartes* Mr. Swainson arranges the following subgenera:—

Subgenus *Sarcoramphus*, Dum. Head and neck naked. Bill and feet strong; the former with an elevated fleshy caruncle.

Example, *Sarcoramphus papa.*

Subgenus *Cathartes*, Ill. Head and part of the neck naked, but without caruncles. Bill and general construction weaker than in the last.

Example, *Cathartes aura.*

Genus *Neophron*, Savigny. Bill much lengthened and remarkably slender. Nostrils longitudinal, nearly medial; cere occupying two-thirds the length of the bill. Face and part of the neck naked. Tail-feathers 14. The tenuirostral type.

Example, *Neophron percnopterus.*

Genus *Catheturus*, Sw. Bill short, thick, curved almost from the base, but the tip not hooked. Nostrils basal and membranaceous; the aperture large, round, central, and nearly naked. Head and neck with only a few scattered feathers. Wings short, rounded. Tail broad, of eighteen feathers. Feet strong; anterior scales irregularly hexagonal; toes large; the lateral of equal length, and very little shorter than the middle toe; all the claws long and slender. The rasorial type.

Example, *Catheturus australis.*

Genus *Gypaëtus*, Storr. Bill strong, lengthened; upper mandible elevated near the end, which is hooked; under mandible provided beneath with a bunch of setaceous bristles directed forwards. Nostrils oval, covered and defended by bristles. Feet short: the three anterior toes united to their base by a membrane; the middle toe very long: claws but slightly curved. Wings long; the first quill rather shorter than the second, the third longest. The fissirostral type.

With reference to *Catheturus*, Mr. Swainson remarks that it is the *Alecturus* of Mr. Gray; but this name having been previously given by Vieillot to a very distinct group of flycatchers, which Mr. Swainson had ascertained, it became necessary for him to propose another. This supposed vulture however is, as we have already shown in the article TALEGALLA, a bird of very different habits from any of the birds of prey.

The Prince of Canino and Musignano makes the *Vulturidæ* the first family of his first order, *Accipitres*, and notices the following subfamilies and genera.

a. Vulturinæ.

Genera: *Neophron*; *Cathartes*; *Sarcoramphus*; *Vultur*; and *Gyps.*

b. Gypaëtinæ.

Genus, *Gypaëtos.*

It must be remembered that none but European and American birds are admitted into this arrangement.

The *Vulturidæ* of Mr. G. R. Gray form the first family of his first suborder (*Accipitres Diurni*) of his first order (*Accipitres*). The following subfamilies and genera are placed by Mr. Gray under this family:—

Subfam. 1. Gypaëtinæ.

Genus: *Gypaëtos.*

Subfam. 2. Cathartinæ.

Genera: *Neophron*; *Cathartes*; and *Sarcoramphus.*

Subfam. 3. Vulturinæ.

Genera: *Gyps* (Sav.); *Vultur*; and *Otogyps* (G. R. Gray).

Subfam. 4. Racaminæ.

Genus: *Gyphoierax*, Rüpp.; *Racama*, J. E. Gray—*Vultur* (*Gyphoierax*) *angolensis.*

EUROPEAN VULTURES.

Example, *Vultur fulvus*, the Griffon Vulture.

Description.—Adult.—Head and neck covered with close-set, short, white, downy feathers; lower part of the neck surrounded with a ruff of long, slender, white feathers, sometimes with a slight tinge. On the middle of the breast a space furnished with white down. The whole of the body, the wings, and the origin of the tail yellow-brown or Isabella colour; quills and tail-feathers blackish-brown; beak livid yellow, cere darker;* iris hazel; feet grey or light brown. Total length exceeding four feet.

The *female* is larger than the *male.*

The *young* have a whitish down varied with brown on the head and neck; the rest of the body very bright yellow, marked with great spots of grey or white.

This is *Le Griffon* of the French; *Weisskÿpfiger Geier* of the Germans; *Avoltoio di color castagno* of the Italians.

Geographical Distribution.—The mountainous parts of the north of Europe, Silesia, the Tyrol, Dalmatia (where it is very numerous), Spain (abundant near Gibraltar), the Alps, the Pyrenees, Turkey, the Grecian Archipelago, the north of Persia, the north of Africa.

The Griffon Vulture.

Nest, Habits, &c.—The nest of this vulture is generally formed upon the most elevated and inaccessible rocks, but it often builds on the highest forest-trees, and, in Sardinia, on the loftiest oaks, where the nest of brushwood and roots is more than three feet in diameter. The eggs, which are generally two in number, though some state that it occasionally lays as many as four, are of a dull greenish or greyish white, slightly marked with pale reddish spots, and with a rough surface. 'Like all the other birds of its tribe,' says Mr. Bennett, in his *Gardens and Menagerie of the Zoological Society*, 'it feeds principally upon dead carcasses, to which it is frequently attracted in very considerable numbers. When it has once made a lodgment upon its prey, it rarely quits the banquet while a morsel of flesh remains, so that it is not uncommon to see it perched upon a putrefying corpse for several successive days. It never attempts to carry off a portion even to satisfy its young, but feeds them by disgorging the half-digested morsel from its maw. Sometimes, but very rarely, it makes its prey of living victims, and even then of such only as are incapable of offering the smallest resistance; for in a contest for superiority it has not that advantage which is possessed by the Falcon tribes, of lacerating its enemy with its talons, and must therefore rely upon its beak alone. It is only however when no other mode of satiating its appetite presents itself, that it has recourse to the destruction of other animals for its subsistence. After feeding, it is seen fixed for hours in one unvaried posture, patiently waiting until the work of digestion is completed, and the stimulus of hunger is renewed, to enable and to urge it to mount again into the upper regions of the air, and fly about in quest of its necessary food. If violently disturbed after a full meal, it is incapable of flight until it has disgorged the contents of its stomach; lightened of which, and freed from their debilitating effects, it is immediately in a condition to soar to such a pitch as, in spite of its magnitude, to become invisible to human sight. In captivity it seems to have no other desire than that of obtaining its regular supply of food. So long as that is afforded it, it manifests a perfect indifference to the circumstances in which it is placed.'

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* Temminck describes it as flesh coloured.

Vultur cinereus.

Descripton.—Old Male.—Posterior part of the head and nape denuded of feathers, the skin of a bluish cast; on the rest of the neck a yellow down; sides of the neck furnished with curled feathers. At the insertion of the wings rises an ample tuft of long loose feathers. General colour of the plumage chocolate-brown, or brown verging towards black and sometimes to fulvous; cere bluish flesh-colour; iris deep brown; tarsus half-plumed, the naked part, as well as the toes, dirty white; claws black. Total length exceeding three feet six inches.

Female rather larger, and with the colours of the plumage more sombre.

Young with the whole of the neck furnished with down; all the feathers of the upper parts terminated by a brighter colour.

This appears to be the *Vautour arrian* and *Vautour noir* of the French; *Cinereous* or *Ash Vulture* and *Bengal Vulture* of Latham; and *Grauer Geier* of the Germans.

Geographical Distribution and Habits.—In Europe, lofty mountains, and the vast forests of Hungary, the Tyrol, and the Pyrenees; the south of Spain and Italy; accidentally in Dalmatia; more common in Sardinia. In Sicily; rarely in Italy, and never in the forests. Very accidentally in Germany. M. Temminck, writing in 1835, says that an individual was killed more than six years ago at Bayreuth. M. Tscharner de Bellerive remarks, that he does not believe that it has ever been killed in Switzerland.

M. Temminck states that its food consists of dead animals and carrion, but never of living animals, of which it shows fear; the least animal, he says, terrifies it. Bechstein's account is very different. According to him the Cinereous Vulture is chiefly seen in the plains in winter, where it attacks not only hares, sheep, and goats, but even deer. The farmers are said to suffer severely from its depredations, for it will frequently pick out the eyes of a sheep; but it is not shy, and suffers the approach of the hunter, who is well paid for shooting the destroyer.

The nidification of this species appears to be unknown to ornithologists. M. Temminck, who states that there exists no well-marked differences between the individuals of India, Egypt, and Europe, thinks that it probably breeds in the mountainous countries of Asia.

This is the genus *Gyps* of Savigny. Mr. Gould, in his great work on the Birds of Europe, notices a deviation in this species from the true or more typical vultures, manifested in the partially bare neck, open ears, curved claws, and powerful beak. These striking features, he remarks, were not passed over by the discriminating eye of Mr. Bennett, while engaged in describing the *Vultur auricularis* of Daudin, which in general form and structure strictly resembles *Vultur cinereus*. 'In *The Gardens and Menagerie of the Zoological Society delineated*,' says Mr. Gould, 'that gentleman intimates that, in his opinion, the bird he has described from a fine living example in the Society's gardens would be found to possess characters sufficiently prominent and different from the rest of the Vultures to form the type of a new genus. Although the Cinereous Vulture has not the longitudinal fold of the skin which is so prominent a feature in *Vultur auricularis*, still we should regard that more as a specific character than as having any influence over its natural economy; and we fully concur in Mr. Bennett's views in considering a further subdivision of the family to be necessary. The two birds in question, with the *Vultur pondicerianus* as a type, would constitute a very natural division.'

Vultur (Gyps) cinereus.

Gypaëtus barbatus.

Description.—Old.—Head and upper part of the neck dirty white; a black stripe extends from the base of the beak, and passes above the eyes; another, arising behind the eyes, passes over the ears; lower part of the neck, breast, and belly, orange-red; mantle, back, and wing-coverts deep grey-brown, but on the centre of each feather is a white longitudinal stripe; wings and tail-feathers ashy-grey, the shafts white; tail long, very much graduated; beak and claws black; feet blue; iris orange; eye surrounded by a red lid. Length about four feet seven inches.

According to the age of the bird the plumage varies as follows:—there are brown feathers more or less on the top of the head; those of the lower part of the neck, breast, and belly often terminated with black; the white stripe on the middle of the feathers of the back and the coverts of the wings more or less developed; the belly often of a grey brown or variegated with white; iris of a more or less deep orange colour.

The Young in the first two years have the head and neck of a brown-black; the lower part of the body grey-brown with spots of dirty white; on the upper part of the back are great white spots; the mantle and the wing-coverts are blackish with brighter spots; quills blackish-brown; iris brown; feet livid.

This is the celebrated *Lämmergeier*. It is the [illegible] *barbuto* of the Italians; the *Weisskopfige Geier Adler*, and *Bartadler* of the Germans; and *Bearded Vulture* of the English.

Geographical Distribution.—The highest mountains of Europe, Asia, and Africa, the chain of the Pyrenees and the Helvetian Alps, Sardinia, Greece, and the Tyrol. In Asia, the chain of the Caucasus, the Himalaya Mountains, the Siberian and Persian Mountains. The most lofty mountains of Central Africa and towards the borders of the Red Sea, principally in the most inaccessible parts of those mountains, and where there is plenty of the larger sort of game. But it becomes more and more rare in proportion as man advances upon the uncultivated regions which it loves to haunt. M. Temminck remarks, that it is now one of the rarest birds of Europe; whereas, formerly, all the high mountains of the Tyrol, Switzerland, and Germany were peopled with the species. It is on record that hunters of the eighteenth century had killed their forty, fifty, or sixty Læmmer-geyers. The chasseur Andreas Durner had killed sixty with his own hand. It is still far from uncommon in Sardinia. M. Temminck adds that he has received individuals from the north of Africa, and a considerable number from the Cape of Good Hope; none of these differed from the individuals belonging to the European Alps.

Habits.—'Unlike the typical vultures,' says Mr. Gould, 'which are distinguished by their bare necks, indicative of their propensity for feeding on carrion, the Læmmer-geyer has the neck thickly covered with feathers, resembling those of the true eagles, with which it also accords in its bold and predatory habits, pouncing with violent impetuosity on animals exceeding itself in size; hence the young Chamois, the Wild Goat, the Mountain Hare, and various species of birds find in it a formidable and ferocious enemy. Having seized its prey, the Læmmer-geyer devours it upon the spot, the straight form of their talons disabling them from carrying it to a distance.* It refuses flesh in a state of putrefaction, unless sharply pressed by hunger; hence nature has limited this species as to numbers: while, on the other hand, to the Vultures, who are destined to clear the earth from animal matter in a state of decomposition, and thus render the utmost service to man in the countries where they abound, she has given an almost illimitable increase.'

Temminck, besides the animals above noticed, says that they will attack young deer, sheep, and calves.

The two white eggs marked with brown blotches are said to be laid on the naked summits of precipitous rocks which are almost inaccessible.

Bruce has given a very graphic account of the death of one of these birds in the fifth volume of his *Travels in Egypt, Arabia, Abyssinia, and Nubia.* It is, he says, called by the vulgar *Abou Duch'n*, or *Father Long-Beard*, which, he supposes, originated from the tuft of hair, as Bruce terms it, under the chin, and he figures it under the title of *Nisser*, its Ethiopic appellation, which is only generic, and imports no more than the English name *Eagle*.

'This noble bird,' writes the African traveller, 'was not an object of any chace or pursuit, nor stood in need of any stratagem to bring him within our reach. Upon the highest top of the mountain Lamalmon, while my servants were refreshing themselves from that toilsome rugged ascent, and enjoying the pleasure of a most delightful climate, eating their dinner in the outer air with several large dishes of boiled goat's flesh before them, this enemy, as he turned out to be to them, appeared suddenly; he did not stoop rapidly from a height, but came flying slowly along the ground, and sat down close to the meat, within the ring the men had made round it. A great shout, or rather cry of distress, called me to the place. I saw the Eagle† stand for a minute, as if to recollect himself, while the servants ran for their lances and shields. I walked up nearly to him, as I had time to do. His attention was fully fixed upon the flesh. I saw him put his foot into the pan, where was a large piece in water prepared for boiling, but finding the smart which he had not expected, he withdrew it, and forsook the piece which he held.

'There were two large pieces, a leg and a shoulder, lying upon a wooden platter, into these he trussed both his claws, and carried them off, but I thought he looked wistfully at the large piece which remained in the warm water. Away he went slowly along the ground, as he had come. The face of the cliff over which criminals are thrown took him from our sight. The Mahometans that drove the asses, who had, as we have already observed, in the course of the journey suffered from the hyæna, were much alarmed, and assured me of his return.

'As I had myself a desire of more intimate acquaintance with him, I loaded a rifle-gun with ball, and sat down close to the platter by the meat. It was not many minutes before he came, and a prodigious shout was raised by my attendants—"He is coming, he is coming"—enough to have discouraged a less courageous animal. Whether he was not quite so hungry as at his first visit, or suspected something from my appearance, I know not; but he made a small turn, and sat down about ten yards from me, the pan with the meat being between me and him. As the field was clear before me, and I did not know but his next move might bring him opposite to some of my people, and so that he might actually get the rest of the meat and make off, I shot him with the ball through the middle of his body, about two inches below the wing, so that he lay down upon the grass without a single flutter. Upon laying hold of his monstrous carcass, I was not a little surprised at seeing my hands covered and tinged with yellow powder or dust. Upon turning him upon his belly, and examining the feathers of his back, they produced a brown dust, the colour of the feathers there. This dust was not in small quantities, for upon striking his breast the yellow powder flew in fully greater quantity than from a hair-dresser's powder-puff.'

The following were the dimensions of this bird. From wing to wing, eight feet four inches. From the tip of the tail to the point of the beak when dead, four feet seven inches. From the joining of the foot to where the leg joins the thigh, four inches only; and from the joint of the thigh to the joining of the body, six inches. Thickness of the extending muscular thigh little less than four inches. Middle claw about two inches and a half long, not very sharp at the point, but extremely strong. From the root of the bill to the point, three inches and a quarter; and one inch and three-quarters in breadth at the root. 'A forked brush of long hair, divided at the point into two, proceeded from the cavity of his lower jaw at the beginning of his throat. He had the smallest eye I ever remember to have seen in a large bird, the aperture being scarcely half an inch. The crown of the head was bare or bald, so was the front where the bill and skull joined.' Weight twenty-two pounds. (Bruce, *Appendix*.)

The Læmmer-geyer.

We now have to call the reader's attention to the only Vulture which, as far as we can find, has ever been found in a wild state in Britain.

Neophron percnopterus.

Description.—Old.—Head and only the front of the neck covered with a naked skin of a livid yellowish colour; the whole plumage pure white, except the great quill-feathers, which are black; feathers of the occiput long and loose; cere orange, iris yellow, mandibles blackish; feet livid yellow, claws black, tail very much graduated. Length two feet and a few inches.

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* But see post, Bruce's account.

† Bruce names it *Nisser Werk* and *Golden Eagle*.

According to age, the bird varies in its plumage, being either deep brown spotted with rusty, or bright grey-brown varied with white and yellow feathers. In this state the naked part of the head is livid, the cere white slightly tinted with orange, the iris brown, and the feet livid white.

The Young in the first year have the naked part of the head livid, covered with a thin grey down; cere and feet grey ash; the whole plumage deep brown varied with yellowish-brown spots; greater quill-feathers black; iris brown.

This is the *Vautour Ourigourap* of Le Vaillant, the *Rhachamah* or *Pharaoh's Hen* of Bruce and others, *Avoltoio aquilino* and *Caporaccajo* of the Italians, and *Maltese Vulture* of Latham.

Geographical Distribution.—Found (very rarely) in the north of Europe, in Switzerland in the neighbourhood of Geneva. Very common in Spain on the Pyrenees, Portugal, Malta, Turkey, and in the Archipelago. Nowhere so abundant as in Africa. Russia as far north as Astracan, Arabia, Persia; the Deccan (Col. Sykes). M. Temminck states that individuals from the south of Africa are always larger those those of Egypt and Europe; and that it is very common in the Isle of Elba and Tuscany.

In October, 1825, one of these birds was killed near Kilve in Somersetshire, and is now in the possession of the Rev. A. Matthew, of that place. It was, when first seen, feeding upon a dead sheep, and had so gorged itself with flesh, that it was either incapable of flight or indisposed for exertion, and was easily shot. At the same time, another bird, apparently of the same species, was seen in the neighbourhood, but escaped.

Egyptian Vulture. (Gould.)

Habits, &c.—This vulture does not congregate, except when the all-attractive carcass calls them together, but goes in pairs, the male and female seldom parting company. 'In the districts which this species inhabits,' says Mr. Yarrell, 'every group of the natives has a pair of these vultures attached to it. The birds roost on the trees in the vicinity, or on the fences which bound the enclosures formed for their cattle. They are to a certain degree domiciled and harmless. The people do them no injury: on the contrary, they are glad to see and encourage them, because they clean the premises of all the offal and filth they can find. In default of other food they eat frogs, lizards, and snakes. They make their nests among rocks, and the Hottentots assured M. le Vaillant that they laid three and sometimes four eggs: but this he had no opportunity of verifying. The eggs are white.' The young are assiduously attended and fed by the parents for the first four months. In Cairo these vultures are so much prized for their scavengering services, for no excrement or filth comes amiss to them, that it is a breach of order to kill them. Col. Sykes states that in the Deccan they are always found in cantonments and camps. For the most part of the day they continue on the wing, soaring in circles. When on the ground, they walk with a peculiar gait, lifting their legs very high.

Kolbe's Vulture has also been found in Europe, and so, it is said, has the *Sociable Vulture.* (See post.)

ASIATIC VULTURES.

Example, *Vultur ponticerianus*, the *Pondicherry Vulture.*

Description.—Adult.—Size of a goose; a long loose naked membrane or wattle takes its origin about an inch below the *meatus auditorius*, and widens into a rounded form in the middle. The whole head and neck naked and flesh-coloured, but there are some short scattered hairs thereon. Crop covered with a small brown down, and round it is a longer white down. All the upper part of the bottom of the neck, as well as its sides, are tipped with a ruff of short rounded feathers; the plumage generally is of a blackish-brown tint; quills black. Bill bluish-black, cere yellow. Feet deep yellow. Length two feet five inches.

Young with the head and neck more or less clothed with short down. (Temm.)

Locality.—Bengal; probably spread over the continent of India: Java, and Sumatra.

The Pondicherry Vulture.

Vultur Indicus, the *Indian Vulture.*

Description.—Adult.—Head and neck denuded of feathers. All the upper plumage Isabella ash-colour varied with brown and whitish; lower parts spotless very bright yellow. A slight short deep brown down, close set and very smooth, covers the breast. Bill black, but the point lighter; naked skin of the head rusty ash.

Sonnerat, Temminck observes, says that the iris is red

but that he had found it whitish in a living bird. Feet **ashy**-black or bluish. Tail rather longer than the wings, **the** feathers of equal length, and the colour blackish. **Size** of a turkey: total length three feet three inches.

The Indian Vulture.

Young with the head and neck covered with light brown down, the whole upper plumage sooty black bordered with dirty grey; all the lower parts of the same colour as the back, but each feather marked along the shafts by a whitish stripe, which enlarges towards the end of the feathers. In some individuals similar marks are to be seen upon the upper feathers. Bill marbled with black and yellow: length not exceeding two feet ten inches. (Temm.)

Locality.—India and Ceylon.

The Chinese Vulture

M. Temminck says that the *Chagouin* of Le Vaillant (*African Ornithology*, pl. 11) is the young of this species.

Habits.—Very voracious. It lingers all day near the sea-shore to prey on the dead fish thrown up by the waves. The species lives generally on carrion, and is said to disinter corpses. The flight of these vultures is heavy, and, like their congeners, they sometimes assemble in vast numbers on the battle-field.

A cut of *Vultur leuconotus*, the *Chinese Vulture*, now in the garden of the Zoological Society in the Regent's Park, is given in the preceding column.

Description.—Brownish black; lower part of the back white, as are the wings beneath and the inside of the thighs. When the wings are closed, the white on the back is not seen. Head brownish black with short dark hairs. Back of the neck covered with whitish down, the front of it livid flesh-colour and bare. At the bottom of the back of the neck is a dirty white ruff. On each side white feathers lap over the bottom of the neck and the crop. The cere is blackish, the bill horn-colour, black at the tip. Iris dark. Legs dirty brown-white with black scales; claws black. Size of a turkey.

AFRICAN VULTURES.

Example, *Vultur Kolbii*, *Kolbe's Vulture*.

Description.—Head covered with downy ferruginous feathers, which are whitish on the back of the neck. A ruff of loose ferruginous or dirty white feathers round the back of the neck. Cere blackish, iris black. Back and wings ferruginous or grey-brown, quills black. Belly rather lighter ferruginous. Feet brownish, claws black. Size less than that of the Griffon Vulture, but in general aspect and plumage very like that species. It is however easily distinguished. In *Kolbe's Vulture* the feathers of the wings and of the lower parts are all rounded at the end. In the *Griffon Vulture* they are long and acuminated. In *Kolbe's Vulture* the ruff is neither so long nor so abundant as in the *Griffon*, and the adult is nearly entirely of a whitish Isabella colour. The adult *Griffon* is uniform bright brown throughout.

This is the *Stront-Jager* of Kolbe, and the *Chasse-fiente* of Temminck.

Kolbe's Vulture

Geographical Distribution.—Barbary and different [illegible] of Africa, India, and Java. Several have been killed in Sardinia.

Vultur auricularis, the *Sociable Vulture*.

Description.—Adult.—Head and greater portion of the neck red and naked, with the exception of a few hardly discernible hairs. Beak horn-coloured, tinged with yellow at its base. Iris chestnut. The folds of red naked skin originate behind the ears, surround the upper part of them, and then descend several inches, being irregular in their outline and nearly an inch broad at their widest part. Throat covered with hairs inclining to black. The lower and back part of the neck clothed with a ruff of blackish curling feathers. Plumage of the body, wings, and tail nearly uniform blackish-brown, rather lighter beneath than above, and on their edges than in the middle. Feathers of the breast, belly, and sides beneath, narrow, long, pointed, projecting from the body so as to discover the nearly pure white down which everywhere closely covers it, and extends beyond the feathers on the lower and anterior parts of the neck, marking the limits of the prominent crop. A similar down, but brownish in colour, appears upon the legs, which are also brownish, and the claws light brown. Size equal to that of the condor. Across the expanded wings upwards of ten feet.

Young, at its exclusion from the egg, covered with whitish down; on quitting the nest, plumage light brown, the feathers bordered with a reddish tinge; those of the chest and abdomen not elongated as in the adult: head and neck entirely covered by a fine close down, so that the ears are scarcely visible through it.

This is the *Oricou* of Le Vaillant and the French; and *Ghaip*, with the preceding clapping sound, of the Namaqua Hottentots.

Habits, &c.—This gigantic species, a fit machine for assisting in the clearance of the soil of Africa from the putrid bodies of elephants, hippopotami, rhinoceroses, and giraffes, haunts the caverns of rocks, and is altogether a mountain bird. There its night is passed, and there among the lofty crags it retires to repose when it has sated its appetite. Le Vaillant saw large flocks of them perched at sun-rise on the precipitous entrances to their abodes, and sometimes the extent of the rocky region was marked by a continued chain of these birds. Their tails are worn down by friction against their craggy haunts and by the soil of the plains, in consequence of the laborious efforts which they make to raise themselves into the air: when once on the wing however, their flight is grand and powerful. They rise higher and higher till their enormous bulk is lost to human ken; but though beyond the sphere of man's vision, the telescopic eye of the bird is at work. The moment any animal sinks to the earth in death, the imperceptible vulture detects it. Does the hunter bring down some large quadruped beyond his powers to remove, and leave it to obtain assistance?—on his return, however speedy, he finds it surrounded by a band of vultures where not one was to be seen a quarter of an hour before.

Le Vaillant first possessed himself of this grand vulture in an island in the Orange River, which, from the number of those animals that frequented it, he named the Isle of Hippopotami. One of these beasts was shot there; and the enterprising French zoologist and his party, after cutting some steaks from it, quitted the island and repaired to the right bank of the river, out of the reach of those sudden floods which make a bivouac near it or on the island so dangerous. It was Le Vaillant's intention to return to the island next morning; but at sun-rise he perceived an immense troop of elephants, which he pursued, not without wounding some of the herd. Thus the day was spent; and the sun was low before they could reach the bank of the river, where they passed the night. In the morning they again went to the island, and as soon as they landed went straight to the slain hippopotamus, with the intention of procuring more provision from it. On the carcass was sitting a magnificent vulture, eagerly occupied in devouring it. Le Vaillant had never seen one of such size, and his joy was great. But that very joy rendered his aim so unsteady, that, in his haste, he only slightly wounded the bird.

In spite of the wound, the vulture, even while endeavouring to fly away, still snatched at its prey with its beak, as if it would fain have carried it off; but the weight of the flesh which it had gorged sat heavy on it, and prevented its taking flight so easily. Le Vaillant and his party had time to come up before it could clear the ground, and endeavoured to kill it with repeated blows; but it made a long and valiant resistance, defending itself with the greatest intrepidity. It snapped at or struck their fire-arms with its beak, and its force was still so great, that at each stroke it left a mark on their gun-barrels. It yielded to its fate at last, and Le Vaillant declares that the possession of [illegible] amply repaid him for all the difficulties and fatigues of his excursion. This was the *Oricou*, the species now under consideration; and when Le Vaillant proceeded to skin it he found six pounds and a half of flesh in its [illegible]. Notwithstanding this enormous quantity, we may conclude that its hunger was still keen, from its unwillingness to quit the body of the hippopotamus, and its [illegible] deportment when at last it was obliged to leave: we thus perceive with what celerity these birds will clear away huge carcasses.

The nest is built in the fissures of rocks, and there the female lays two, rarely three eggs. While she is [illegible] the male keeps watch at the entrance of the cave, a habit which leads to detection. The spot selected however is generally so inaccessible, that advantage can rarely be taken of the indication. When it is reached the whole is sickening to the sight and smell: the [illegible] described as insupportable, Le Vaillant however [illegible]. They seem to be gregarious, living in [illegible] companies, and agreeing well together. One cavern will sometimes conceal as many nests as there are [illegible] cavities; and occasionally two or three nests are [illegible] the same cavern side by side.

Locality.—South Africa. The Namaqua country especially, where it appears to have been first observed and described by Le Vaillant. North and South Africa (Temm.) Temminck states that it is also found in Greece in the neighbourhood of Athens, and must be therefore added to the catalogue of European birds; but it does not appear in Mr. Gould's grand work of the 'Birds of Eu[illegible]

The Sociable Vulture.

AMERICAN VULTURES.

An account of the CONDOR and TURKEY-BUZZARD, &c. will be found under those articles, and we must here limit ourselves to a description of

Sarcoramphus papa, the *King Vulture*, or *King of the Vultures*.

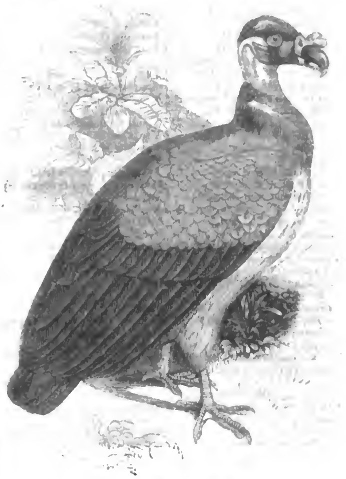
Description.—Adult.—Naked skin of the head and neck brilliantly coloured. Beak reddish, with a shade of black; cere bright orange, prolonged between the nostrils into a comb about an inch and a half long, loose in texture, and falling on either side of the bill when the head is erect. Round the eye a scarlet circle; iris nearly colourless; side of the head purplish black. Back of the head covered with short down inclining to black. On each side behind the eye several broad and deep wrinkles of the skin, whence rises a thick and prominent fold extending obliquely downwards along the neck, reddish-brown mixed with blue, and marked with many lines of small black hairs. From the bright red upper part of the neck the colour gradually lessens in intensity, fading into orange and yellow towards the lower part. Round the bottom of the neck is a broad ruff of soft, downy, deep ashy-grey feathers. Back and tail-coverts bright fawn, becoming lighter and lighter as the bird grows older; quills, greater wing-coverts, and tail-feathers glossy black. Legs and claws dusky black, sometimes dirty yellowish-white. Total length, about two feet and a half. Across the expanded wings, more than five feet.

Young of the Year, &c.—Deep bluish, with the exception of the abdomen and lateral tail-coverts, which are white. In the next year the young becomes dusky, marked with longitudinal white spots, and up to that time the greater portion of the head and neck is blackish violet. The colouring which marks the adult is assumed in the third year, excepting a few black feathers among the upper coverts of the wing.

This is the *Cozcaquauhtli* (Queen of the Vultures) of the Mexicans (Hernandez). Mr. Bennett remarks that its more usual name in that country appears to be *Tzopilotl*; but this Mexican term, according to Hernandez and the description given, appears to be applicable to the *Vultur aura*, Linn., and not to the *Papa*. Indeed the figure in that work appears to have crept in by mistake, for it accords not at all with the description of the *Tzopilotl*, and appears more like a parrot, especially in the feet, than a vulture of any kind. The description of the *Cozquauhtli* in John de Laet agrees more with the *Vultur aura*, Linn.: he also mentions the *Tzopilotl*. According to Sonnini, the last appellation is given to it in Guiana; and in Paraguay its name is *Iruburubicha*, or *King of the Vultures*.

Habits, &c.—With a highly developed sense of smelling and a piercing sight, the expanse and strength of the wing of the King Vulture enables it to reach a lofty height, and there remain, bringing its powers of observation to bear over a wide tract of country. Patient under hunger, this vulture is said never to attack birds and quadrupeds, however small, while they are alive; though, when pressed with hunger from the want of its favourite carrion, it will feed upon snakes and lizards. A plentiful and inviting table is spread for it during the summer in the dried up lakes reeking with the putrid fish which have there perished. Perched on the highest trees, it is most frequently to be seen alone or in pairs; but in Mexico travellers state that they have seen it in large flocks. The story that the other vultures stand patiently by till this, their monarch, has finished his repast, appears to be not without foundation, and may be easily accounted for by the superior strength and courage of this species. The general opinion seems to be that these vultures make their nests in the hollows of trees, and that they lay two eggs.

Geographical Distribution.—Wide. Occasionally in Florida, in the United States, which is probably the northern limit. Common in Paraguay, but, according to D'Azara, not going beyond 32° S. lat. Between the limits, especially towards the central parts of America, it appears to be abundant.



The King Vulture. Vultur papa.

VULVULI'NA. [Foraminifera, vol. x., p. 348.]

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W.

W is a letter which performs the double office of a consonant and a vowel. According to the decisive experiments of Professor Willis (*Cambridge Phil. Trans.*, iii. 231), the natural order of the vowels is *i*, *e*, *a*, *o*, *u*, or the reverse, in which the sounds must be understood to be those which prevail on the Continent. The sounds then of *i*, that is *ee*, and *u*, that is *oo*, are the most remote, and the attempt to pass with rapidity from either of these to the others, more particularly to the other extreme, gives an initial breathing which has the character of a consonant, viz. in the one case *ee-oo*, or *you*; in the other *oo-ee*, or *we*. Hence it is that the letters *y* and *w* appear as the representatives, sometimes of a consonant, sometimes of a vowel. The English character *w* is formed by the repetition of a *v*, which itself is only a variety of the symbol *u*, and that again has in all probability grown out of the letter *o*. [Alphabet.] The Anglo-Saxon alphabet employs the symbol ƿ. In Latin the *v* or *u consonans* had probably the power of a *w*, a supposition which at once accounts for the use of a common character for the vowel and consonant. The Greek and Hebrew alphabets had also a single symbol for this consonant, which occupied the sixth place, and is called digamma in the former, *vau* or *waf* in the latter. But in the Greek alphabet the letter went out of use, and is therefore commonly omitted in our Grammars of that language, although the gap at this point in the alphabetical designation of numbers still bears evidence to the original position of the letter. [Digamma.] Most of the modern languages of Europe are deficient in a symbol for this letter. The French employ what is a sufficient though a clumsy equivalent, the diphthong *ou* prefixed to a vowel, as in the common particle *oui*; the Spaniards prefer *hu*, as in *huevo*, *hueso*. In this way the map of the New World often gives testimony as to the race of Europeans who originally settled in the country. Thus the Indian tribe which has furnished a name to the territory belonging to the United States now called Wisconsin, in the old maps is written Ouisconsin, that country having been first visited by the French. So again in Mexico, the town Chihuahua (pronounced Chiwáwa) tells us that its name was first written by Spaniards; and the same may be said in the map of Peru of the river Huallaga: and the numerous towns commencing with the same syllable, as Huancavelica, Huancayo, Huanuco, Huancabamba, &c. At other times the Spaniards have employed the letters *gu*, as may be seen in the different rivers of Spain Proper, which have prefixed the Arabic word *guad*, denoting water; and this mode too of representing a *w* is to be traced in Spanish America in Guamanga, Guanca, Guancarama, Guatemala, &c. The antient Greeks again often prefixed a simple *o* to represent a *w*, as in *οὐα*, &c. [Digamma.] We have hitherto spoken of the consonantal power of the letter; its use as a vowel, so far as our own language is concerned, is confined to the end of syllables; and there is always another vowel prefixed to it, as in *new*, *law*, *show*, but in the Welsh language it is employed by itself, and in the middle of syllables with the power of a vowel. The map of Wales will furnish abundant examples, as Pwlheli, Cwmtydr, Bettws, Llwchwr, often written Loughor, &c.

Many nations have a difficulty in pronouncing the consonantal *w*. This is more particularly the case in some parts of Germany, where the people are unable to appreciate the difference between a *w* and a *v*, almost always substituting the latter sound, or what nearly approaches to it. Hence it is important for the philologist to distrust the evidence and criticism of a German scholar when these sounds are in question; and this caution may be more particularly given in reference to German writings upon the Sanscrit language. London too is remarkable for the confusion of the sounds, though this confusion does not seem to arise from any inability to pronounce either a *w* or a *v*, each being substituted for the other with a most amusing perversity.

The other interchanges of this letter have been already given under the preceding letters. See C, § 4 and 7; G, § 6; H, § 7; M, § 5; O, § 11; R, § 8; S, § 11; and Digamma. We believe there are languages in which the consonant *y* is interchanged with *w*, but we cannot at the moment recall any instances.

WAADT. [Vaud.]

WAAGE, ISLANDS OF. [Trondhiem.]

WAAL. [Netherlands; Rhine.]

WABASH. [Mississippi, River.]

WACHENDO'RFIA, a genus of plants named after E. J. Wachendorf, professor of medicine and botany at Utrecht. He published, in 1747, a work entitled 'Horti Ultrajectani Index.' Under this modest title he projected a new system of classification of plants, in which he arranged the vegetable kingdom in families, according to the structure of the calyx, corolla, stamens, and pistils: in the genera and species he followed Linnæus. In 1743 he published an oration on the wisdom of God as displayed in the vegetable creation. He died in 1758, aged fifty-six.

The genus Wachendorfia belongs to the natural order Hæmodoraceæ. It has an inferior flower, with six permanent, withering, irregular, oblong parts; the three upper ones most erect, of which the two lateral ones have each a spur at the base; the three lower ones widely spreading. The stamens are three, with thread-shaped, declinated, declining filaments, shorter than the corolla: the anthers oblong, incumbent. The ovary is superior, roundish, with three furrows; style thread-shaped, declining; the stigma simple, tubular. The fruit is a three-lobed, triangular, obtuse, compressed capsule, with three valves, and three cells. The seeds are solitary, rough or hairy, and compressed.

W. thyrsifolia, tall-flowering Wachendorfia, has perennial smooth leaves, with a close oblong panicle. It is a native of the Cape of Good Hope, and thrives well in greenhouses in this country, and it will grow in the open air in fine seasons in May and June. The flowers are of a fine golden colour. The root is perennial, and of a [illegible] or red colour. Many of the plants belonging to Hæmodoraceæ yield a matter used for dyeing, and De Candolle remarks that it is probable the species of Wachendorfia might be used for the same purpose.

W. paniculata, spreading-panicled Wachendorfia, has the scape many-spiked, the panicle spreading, the leaves annual, sword-shaped, 3-nerved, plaited, smooth. It is a native of the Cape of Good Hope. From the colour of its root it is sometimes called Red-bulb. This plant seldom flowers in this country. Its flowers are larger than the last, and of a deeper orange tinge on the outside.

W. hirsuta, hairy Wachendorfia, has a many-spiked scape, a spreading panicle, and sword-shaped, linear, [illegible]-nerved, plaited, villous leaves. It was found at the Cape by Thunberg. It is distinguished from the other species by its narrow leaves covered with long white hairs. Its flowers are large and of a bright yellow colour.

The species of Wachendorfia may be propagated by offsets, taken from the heads of the roots in the beginning of autumn, and planted in pots containing loam mixed with a little sea-sand.

WACHTER, JOHN GEORGE, a distinguished scholar and archæologist, was born at Memmingen in Swabia, in 1673. He studied classical, oriental, and modern languages, and became early known for his learning: he was thoroughly acquainted with numismatics. Combining great sagacity and a sound judgment with an extensive stock of knowledge, he was able to produce works some of which are still among the best of their kind. For some time he was employed in the Museum of Antiquities at Berlin, and was chosen member of the Royal Academy of Sciences of that city. However, the first kings of Prussia, Frederic I. and William I., showed little disposition to promote the arts and sciences, and Wachter left Prussia for Leipzig, where he was appointed first librarian and director of the Museum of Antiquities. He died in [illegible]. His principal works are:—1, 'Glossarii Germanici Specimen ex ampliore Farragine decerptum,' Leipzig, [illegible] 8vo.; this work was the forerunner of 'Glossarium Germanicum, continens Origines et Antiquitates totius Linguae Germanicae,' Leipzig, 1736-37, 2 vols. fol. This a his principal work, and is still considered a standard book. Wachter understood all the dialects of the High and Low German languages, and he had also a complete knowledge of the Persian language, which enabled him to establish the meaning and etymology of a great number of words. He was one of the most distinguished founders of the school of comparative grammar. 3, 'Archaeologia Nummaria,' &c., in 'Nova Acta Eruditorum,' and separately, Leipzig, 1740, 4to. The chief object of this work was the explanation of the difficulties connected with the study of numismatics. In the last chapter the author discusses several passages of Pliny (*Hist. Nat.*), concerning coins, and although these passages had already been illustrated by eminent men, such as Father Hardouin and others, the results of Wachter were much more satisfactory. 4, 'Naturae et Scripturae Concordia, Commentario de Literis ac Numeris Primaevis illustrata et Tabulis Aeneis depicta,' Leipzig, 1752, 4to., without the author's name. Besides these and other works on similar subjects, Wachter wrote a great number of valuable memoirs for the 'Miscellanea Berolinensia' (first series) and the 'Nova Acta Eruditorum,' such as 'Tyrannus in Veteri Gemma monstroso et portentoso emblemate repraesentatus;' 'De Alphabeto Naturae et Literarum non Naturalium à Naturalibus Origine Animadversiones;' 'Ad Dissertationem Eruditam Viri Clarissimi Swentoni de Lingua Etruriae, &c. Annotatiuncula,' &c. In his last will Wachter left the MS. of his great Glossary, which he had enriched with notes and numerous additions, to the library of his native town, Memmingen, where it is still kept. Other valuable linguistic dissertations in MS. are in the Royal Library at Dresden.

(Th. Heinsius, *Teut.*, vol. iv., p. 453, &c.; Ebert, *Allgemeines Bibliographisches Lexicon.*)

WADDING, LUKE, a Roman Catholic priest of great learning and ability, was born at Waterford, in Ireland, 16th October, 1588. Having been sent abroad in his fifteenth year to complete his education for the ecclesiastical profession, he first spent six months at an Irish seminary belonging to the Jesuits at Lisbon; and then, having joined the order of the Franciscans in 1605, he continued his studies in their convents at Liria, at Lisbon, and at Coimbra. On taking priest's orders he went to Salamanca, and, after residing for some time in that university, was made superintendant of the students and lecturer in divinity. In these offices he acquitted himself so much to the satisfaction of the heads of his order, that, in 1618, when Anthony-à-Trejo, the vicar-general of the Franciscans, was promoted to the bishopric of Cartagena, and was sent as legate from Philip III. of Spain to Pope Paul V. for the settlement of the dispute which divided the Romish Church about the immaculate conception of the Virgin Mary, he took Wadding with him to Rome as chaplain to the embassy, an appointment of distinction and influence, which was coveted by the most eminent members of the order. Wadding did not spend his time in idleness while holding this office: the result of his researches in the libraries not only of Rome, but of Assisi, Perugia, Naples, and many other cities, was the publication at Louvain, in 1624, of a history of the embassy, in a folio volume, entitled 'Legatio Philippi III. et IV., Hispaniae Regum, ad Sanctissimos D. D. Paulum V. et Gregorium XV. et Urbanum VIII., pro definienda Controversia Conceptionis B. Mariae Virginis; per illustrissimum Anthonium-à-Trejo.' He had also, before this great work appeared, written three pamphlets on the point in controversy; and although, after the bishop of Cartagena returned to Spain, the whole weight of the negotiation, made over nominally to the Spanish ambassador, the duke of Albuquerque, rested upon his shoulders, he found leisure to carry through the press, and to write a learned introduction to, the great Hebrew Concordance of Marius de Calasio, which accordingly appeared at Rome, in 4 vols. folio, in 1621. De Calasio had died at Rome after completing his manuscript, and the funds for printing the work were obtained on the application of Wadding from Paul V. and Benignus-à-Genua, the general of the Franciscans. A second and superior edition of this Concordance was published at London, in 4 vols. folio, in 1747 and following years, under the care of the Rev. William Romaine. Wadding also prepared an edition of certain writings of St. Francis from manuscripts in the libraries at Rome, which was brought out at Antwerp in 1623, under the title of 'Sancti Francisci Libri Tres.' He spent the rest of his life at Rome, where, in 1625, he founded the college of St. Isidore, for the education of Irish students of the Franciscan order, and where he was also instrumental in procuring the establishment and endowment of various other institutions for the advancement of theological learning. From 1630 to 1634 he held the appointment of procurator for the Franciscans at Rome; and in 1645 he was appointed vice-commissary of his order, but resigned that dignity in 1648. Of several other works which he edited, the most important is a complete collection of the writings of Duns Scotus, which appeared at Lyon in 1639, in 12 vols. folio, now of great rarity. Of his original works, the greatest is his 'Annales Minorum, seu Historia Trium Ordinum à S. Francisco institutorum,' which was printed in 8 vols. folio, the first seven at Lyon, in 1647 and following years, the eighth at Rome in 1654. There is a second and improved edition of this work, brought out under the care of Joseph Maria Fonseca, in 19 vols. folio, at Rome, 1731-1744; and a Supplement to this was published in one volume, folio, at Rome, in 1806, a posthumous work of a Franciscan named Joannes Hyacinthus Sbaralea. Wadding also published at Rome, in 1 vol. folio, in 1650, a valuable bibliographical history of the Franciscans, under the title of 'Scriptores Ordinis Minorum.' To this a supplement was published, in 1 vol. 4to., at Salamanca, in 1728, by Friar Joannes à Divo Antonio. Wadding, after declining the offer of a cardinal's hat, died at Rome, 18th November, 1657.

WADERS, or WADING BIRDS. [Grallæ; Grallatores.]

WADHAM COLLEGE, OXFORD, was founded by Nicholas Wadham, of Merifield in Somersetshire, and Dorothy his wife, in 1612, for a warden, fifteen fellows, fifteen scholars, two chaplains, and two clerks.

The Fellows are elected from the Scholars, and are superannuated on the completion of eighteen years from the expiration of their regency. The Scholars must be natives of some county of Great Britain, and not have exceeded their nineteenth year at the time of their election; natives of Essex and Somersetshire, and persons of kin to the Founder, if duly qualified, are, in certain cases, entitled to a preference.

There are ten exhibitions founded by Dr. Humphrey Hody; four for the study of Hebrew, and six for the study of Greek. The exhibitioners are examined once in every Term by the Regius Professors of those languages. There are also other Exhibitions given by Bishop Lisle, Sir Benjamin Maddox, &c., together with one for the study of Botany, bequeathed by Richard Warner, Esq. But the greatest benefactor to the college was the Rev. John Wills, D.D., Warden, who died in 1806, and left by his will, subject to legacy-tax, besides considerable sums for the augmentation of the Wardenship, and the improvement of the Warden's lodgings; 100*l*. a year for a Law Exhibition for a Fellow; 20*l*. a year for a Law Exhibition to a Scholar; 100*l*. a year for a Medical Exhibition to a Fellow; and 20*l*. a year for a Medical Exhibition to a Scholar. He also bequeathed 31*l*. 10*s*. a year to a Divinity Lecturer and Preacher; 75*l*. a year to one superannuated Fellow; and 50*l*. a year to a second; and appointed the college his residuary legatee.

The patronage of Wadham College consists in the rectories of Bromley parva, and Fryerning alias Ginge Hospital, with the vicarage of Hockleigh in Essex; the rectory of Bourton on the Water, with the chapelries of Clapton and Lower Slaughter, and the vicarage of Southropp in Gloucestershire; the rectories of Maperton and Limmington in Somerset; the rectory of Esher in Surrey; the vicarage of Wadhurst in Sussex; and the rectory of Orcheston St. George in Wiltshire.

Among the more distinguished members of this College were the bishops Wilkins, Sprat, and Seth Ward, Sir Christopher Wren, Wilmot earl of Rochester, Humphrey Hody, already mentioned, Dr. Benjamin Kennicott the collator of the Hebrew manuscripts of the Old Testament, Harris the author of 'Hermes,' Professor White, and Richardson the author of the Persian Dictionary.

The buildings of this College, the most uniform of any in the University, are comprised in an extensive quadrangle, about one hundred and thirty feet square, of modern Gothic, entered through a gate under a tower. Three sides of this quadrangle contain chambers for the Society and the Warden's lodgings, and on the east side are the hall and chapel. The Library and Chapel, extending eastward, form two sides of an inner or garden court. A portico in the centre of the east side of the great quadrangle is ornamented by the royal arms in sculpture, and statues of king James I. and of Nicholas and Dorothy Wadham, Nicholas in armour, holding a model of the college in his hand.

The expense of building this college is recorded in a manuscript folio of about two hundred and fifty pages. The cost of building was 10,816*l.* 7*s.* 8*d.* The sum total, including the kitchen-furniture and college plate, 11,360*l.* The whole was defrayed by the foundress.

This college was built upon the site of the antient house of the Augustine Friars. The Royal Society had its origin in this college, and held its earliest sittings, from 1652 to 1659, in the great room over the gateway, then part of the Warden's, Dr. Wilkins's, lodgings.

The number of Members on the books of this College, Dec. 31, 1842, was 279.

(Gutch's *Hist. of the Colleges and Halls*; Chalmers, *College and Halls of Oxford*, ii., 403-416; Ingram's *Memorials of Oxford*, vol. ii.; *Oxford University Calendar* for 1843, pp. 333-339.)

WADSTENA. [SWEDEN.]

WADSTROEM, CARL BERNS, was born at Stockholm, in the year 1746. He entered the Swedish service as an engineer. His acquirements in mineralogy and mechanics procured for him (1767-8) the direction of the works at Trolhætta on the Wener canal. In 1769 he was appointed superintendant of the copper-mines at Atvedaberg. He was subsequently promoted to be chief director of the Royal Assay and Refining Office, and enjoyed the confidence of the king.

While thus steadily advancing in his professional career, Wadstroem found leisure at intervals to visit many parts of Europe. He had contracted that prejudice against commerce and commercial men, so natural to an individual who has been highly educated, and whose experience of practical life has been gained principally in the disciplined service of a government. His enthusiastic and imaginative turn of mind had adopted many of the views of Raynal and Rousseau. It is also alleged—with what degree of truth is uncertain—that the tenets of Swedenborg had made some impression upon Wadstroem. Be this as it may, he conceived, about the beginning of 1787, the idea of a journey into the interior of Africa. The botanist Sparrman and the mineralogist Arrhenius were persuaded to accompany him; and Gustavus III. advanced funds for the expedition. M. de Staël, Swedish minister at Paris, entered zealously into the project, and, mainly through his instrumentality, a free passage in a French ship from Hâvre to Senegal was obtained for the three associates. They sailed in August, 1787.

After their arrival at Senegal they made several excursions in the vicinity of St. Louis, but finding the obstacles in the way of their advance into the interior insurmountable, they repaired to the English settlement at Sierra Leone, in hopes of finding there the means of carrying their intentions into effect. Here again they were disappointed, and they left the colony for England towards the close of 1788.

The question of the abolition of the slave-trade was anxiously discussed at the moment of their arrival. Wadstroem had visited London two years earlier, and contracted some acquaintances. As soon as it was known that he and his companion Sparrmann were just returned from the coast of Africa, they were invited to give evidence, in the first place, before the privy council, and afterwards before a committee of the House of Commons. Wadstroem now set himself for the first time to study the slave question with earnestness and attention. As might have been anticipated from his turn of mind, the inquiry terminated in his becoming a zealous advocate of the views of Clarkson, Granville Sharpe, and Wilberforce. In the course of the year 1789 he published 'Observations on the Slave Trade, and a Description of some part of the Coast of Guinea during a Voyage made in 1787 and 1788, in company with Dr. A. Sparrman and Captain Arrhenius.' This is a mere occasional pamphlet, published to promote the views of the slave-trade abolitionists. From an advertisement at the end, we learn that the author had already given to the world 'Two Views of the Coast of Guinea, with separate Descriptions, embellished with four small prints;' and from an incidental remark in the body of the pamphlet we learn that he contemplated publishing the whole of his voyage. This latter undertaking was never realised.

In his 'Observations on the Slave Trade,' the idea of establishing colonies on the west coast of Africa as a means of civilizing the natives and ultimately destroying the slave-trade, appears to have been thrown out for the first time. The hint was acted upon, and to it we are indebted for the British settlement at Sierra Leone (on its present footing), and for that on the island of Bulama. To the discussions which arose in the course of realizing the project we are in all probability indebted for 'An Essay on Colonization, particularly applied to the Western Coast of Africa, with some free Thoughts on Colonization and Commerce; also brief Descriptions of the Colonies already formed or contemplated in Africa, including those of Sierra Leone and Bulama.' The first part of this work appeared in 1794, the second part early in 1795. The book is not without signs of talent; it bears ample traces of enthusiastic benevolence, but its views are crude in the last degree. The early prejudices of the author against commerce had been modified by conversation with better economists, but not obliterated. His old and new principles contend for mastery in the most bewildering manner. He contradicts himself in many places.

The devastation of Sierra Leone by a French squadron (1794) appears to have supplied the inducement which carried Wadstroem to Paris in 1795. He memorialized the Directory and the legislative body in that year, urging an agreement between France and England to recognise in future Sierra Leone, Bulama, and any similar settlements that might be made in Africa as neutral territories.

In 1796 Wadstroem induced his old friend De Staël to strengthen his representations by a letter to Lacroix, the minister for foreign affairs. Their united representations were fruitless. The accession of Talleyrand to office, whose predilection for colonizing was known, appears to have stimulated Wadstroem to another effort. In 17 he published a brief sketch of the history of Sierra Leone and Bulama, appended to it De Staël's letter, and one from Afzelins, a Swedish naturalist, who had been in Sierra Leone at the time the colony was attacked by the French and also an abstract of his own essay on colonization, and dedicated the whole to the minister. The only effect of this publication appears to have been the exciting the Chief Consul's curiosity to see Wadstroem's essay. The interruption of all communication with England rendered it impossible to procure his book from this country, and Wadstroem had the gratification (to him it was a gratification, for he admired Bonaparte) of presenting to the French ruler the only copy in France.

Wadstroem did not long survive this incident: he died of a pulmonary consumption in the spring of 1799. His only publications are the works mentioned above. From them, from some passages in his evidence before the slave-trade committee of the House of Commons, from a notice of his life, by Helen Maria Williams, in the 'Annual Biography' for 1799, and from a memoir in the 'Biographie Universelle,' by Jacob, this sketch has been compiled.

WAEL, or WAAL, CORNELIUS DE, a clever battle-painter, born at Antwerp in 1594. He was the son and pupil of John de Wael, a good figure-painter. Cornelius went with his brother Lucas, a landscape-painter, to Genoa, with the intention of remaining only a short time there, and then of visiting Rome to prosecute his studies. Some of his pieces however being very much admired in Genoa, he was induced to remain there, and he found employment for sixteen years. He painted pictures of various descriptions, but he excelled chiefly in land- and sea-fights, in which he always introduced a great many very excellent figures of a small size. De Wael at last visited Rome, but found the climate disagree with him, and he returned to Genoa after a year. He was induced however to try a second visit; and after returning a second time to Genoa for a short period, he went a third time to Rome, where, says Soprani, he died a few days after his arrival, in 1662. His best pieces, says Houbraken, were painted for Philip III. of Spain, and for the duke of Aarschot.

Lucas de Wael was born likewise at Antwerp, in 1591. After he had received some instruction from his father, he studied with John Breugel, and painted many pictures in his style. Lucas lived in Italy with his brother, and painted in Genoa many excellent landscapes both in fresco and in oil. Lucas returned to Antwerp about 1660; when he died, Houbraken has not mentioned. Pilkington's 'Dictionary' (ed. 1829) gives 1676 as the date of his death.

Cornelius de Wael etched many good plates after his own designs.

WAFER, a small round piece of dried paste, which is used to fasten letters. The piece of consecrated cake which is given by the Roman Catholic priest in extreme unction is also called a wafer, and thin cake formed into a roll, and called wafers, is still sold by pastrycooks. In fact the word was used in England to signify a thin cake long before wafers for sealing letters were invented. A pastrycook was called a wafirer:—

> 'A wafirer well ye wyt, and serve many lordes.'
>
> *Piers Plowman.*

Waffel is the name given by the Germans to a thin cake made with flour, eggs, sugar, &c.; the Dutch call such a cake *wafel*, and the Danes *vaffel*. The French call it *gaufre*, and this word is incorrectly given in some French dictionaries as the translation of the English word wafer. The French name for a wafer is *pain à cacheter*, and wafers are *pains à cacheter*. The Anglo-Saxons also had the name *waffel*. By the following extract, given in Peck's *Desiderata Curiosa*, vol. ii., p. 549, it appears that the thin cake called wafers was given with wine at funeral entertainments:—'1671, Jan. 2, died Mr. Cornelius Bee, bookseller in Little Britain; buried 4 Jan. at St. Bartholomew's, without sermon, without wine or wafers; onely gloves and rosemary.'

To make common wafers, a liquid paste is made with flour and cold water, very smooth, and colouring-matter is then mixed with it. The baking is done with an instrument similar to that which is used to make *gaufres* and *waffeln*. It consists of two thin plates of iron; the upper plate closes upon the lower, which is made with a ledge, and thus forms a mould for the paste. Both plates having been warmed, and greased to prevent adhesion, some of the liquid paste is poured into the lower plate, and the upper plate is then shut down, which forces out any superfluous paste and forms the rest into a thin and even layer. The instrument, which is held by a handle like that of a frying-pan, is placed for a few moments over a fire, and the sheet of baked paste is then taken out and dried in the air, when it becomes firm and brittle, and is cut with a suitable instrument into wafers.

Fancy wafers are made of gelatine, in a variety of forms; and large coarse wafers are mixed with poison to destroy black beetles.

(*Dictionnaire Technologique*; and other *Dictionaries*.)

WAGEL, or WAGEL GULL, the name by which the young of the *Cobb*, *Larus marinus*, is designated.

WAGENSEIL, JOHN CHRISTOPHER, a learned German, whose reputation however was much greater than his real merit. He was born at Nürnberg, in 1633, and educated in Sweden: he finished his academical studies at Rostock and Greifswald. Gifted with a prodigious memory, he made himself a name by showing what he had learned. In 1657 he accompanied some young German noblemen as tutor, on a tour through Western Europe; the party remained six years abroad. During their stay in Italy Wagenseil was chosen member of the Academies of Literature and Sciences of Padua and Turin, and in Turin he discovered, in the Museum of Antiquities of the duke of Savoy, the celebrated Table of Isis, which was formerly in possession of the duke of Mantua, from whose library it disappeared in 1630, and nobody knew who had carried it off. The faculty of law at Orleans conferred upon him the degree of doctor in law; and Colbert, according to the system of bribery then adopted by France with respect to German philosophers and scholars of reputation, gave him a pension of 1500 livres, in order that he might 'blow the trumpet of glory for King Louis XIV. in Spain,' whither Wagenseil and his pupils were going. In 1667 Wagenseil became professor of history in the university of Altdorf; he also lectured on canon law and Oriental languages: he knew Hebrew well. In 1673 the professorship of Oriental languages at Leiden was offered to him, but he declined it. In 1676 he was appointed chief tutor of the young counts palatine. He died in 1705. His daughter Helena Sibylla, married to professor Mollern, was renowned for her learning, and was chosen member of the Academy of Padua. Wagenseil published a great number of works and treatises on very different subjects. The principal are:—1, 'Sota: hoc est, Liber Mischnicus de Uxore Adulterii suspecta,' Altdorf, 1674, 4to.; a large volume, containing the Hebrew text and a Latin translation of the Mishna and Ghemara: the author's notes are much esteemed by Hebrew scholars. 2, 'Tela Ignea Satanae: hoc est, Arcani et Horribiles Judaeorum adversus Christum Deum et Christianam Religionem 'Ανέκδοτοι,' Altdorf, 1681, 2 vols. 4to. This is a collection of the principal works written by Jews against the Christian faith, with a Latin translation of Wagenseil, who refutes the Jews in his notes. 3, 'De Re Monetali Veterum Romanorum Dissertatio,' Altdorf, 1691, 12mo. 4, 'De Cena Trimalcionis nuper sub Petronii Nomine vulgata Dissertationes H. Valesii et J. C. Wagenseilii,' Paris, 1666, 8vo. 5, 'Exercitationes Varii Argumenti,' 1719, 4to., published after the author's death by Roth-Scholtzius, who has added a biography of Wagenseil. The greater part of the works of Wagenseil are in the Library of the British Museum. A 'Vita J. C. Wagenseilii,' with a catalogue of his works and an analytical examination of them, was published at Nürnberg, 1719, 4to.

(Jöcher, *Allgemeines Gelehrten Lexicon*.)

WAGER. In a wager or bet, two parties stake money against each other on the happening or failure of a certain event: A is to pay a certain sum to B if the event happen one way; and B is to pay a certain sum to A if the event happen the other way. Thus, if John bet Thomas three to one (in pounds) that he will win the game, and it turn out that he does win the game, he (John) is to receive one pound from Thomas; but if John should not win the game, Thomas is to receive three pounds from John.

The principle of a wager exists in a great multitude of transactions which do not bear the name: in fact, every commercial affair in which money is risked upon a possibility of receiving more than legal interest in consideration of that risk, is a wager. Thus, if John lend Thomas 100*l.* to engage in an adventure, knowing that he can receive nothing if it fail, and in consideration of 150*l.* if it succeed, it is a wager of the following kind. If the money be out a year, and John could safely make five per cent. of it, he risks 105*l.* in case of loss, and is to receive 45*l.* in that of gain; so that in fact it is as if John bet Thomas 105 to 45, that the speculation would succeed. For if we were to suppose that John lends Thomas 100*l.* for a year at five per cent., on good security, and makes the above wager besides, they will be found to be in exactly the position originally described.

A fire insurance is a simple wager between the office and the party; and a life assurance is a collection of wagers. There is something of the principle of a wager in every transaction in which the results of a future event are to bring gain or loss. And in every game of chance, we have a wager or a collection of wagers, whenever money is staked.

Much has been written and said upon the morality of wagers, in which the word is understood in its common acceptation, namely, that there is nothing but a stake of money, made in a manner which has no reference to commercial advantage, and no tendency to promote the physical well-being of the community. It is however exceedingly difficult to draw the line between the pure wager, which is nothing else, and the commercial wager. The loan of John to Thomas, above described, may be a useful transaction: it may give the country a new mine or a new market. But it does not follow that the pure wager, or a case which is generally so considered, may not be also useful. It were to be wished that, in considering this matter, the right and wrong of the transaction itself should be always carefully separated from the tendency of the collateral circumstances connected with it. One or two instances will explain our meaning.

A horse-racer and a stock-jobber are two of the characters which are set down in public opinion as mere gamblers, and so are a billiard-player and a hazard-player. All four are considered to belong to the same class. Now it is true that the occupations of all but the second are generally connected with much that is objectionable, and which, though not necessarily attached to their mode of life, are so frequently consequent upon it, that the strength of the tendency is sufficient to justify the warning which writers upon morals give against the pursuit of gambling. And among all the four descriptions of characters are to be found the full proportion of those whose society is not coveted by a very respectable minority of the nation. But though many a man born to better things has been ruined by each of the four pursuits, it would be unjust to say that there is no distinction between them. We doubt whether billiards or hazard ever were the cause of any benefit to society; the wager which ends in a wager seems to be the proper description of both. But horse-racing has at least improved the breed of horses; and, as business is now transacted, it is due to the stock-jobber that funded property can be turned into money, or *vice versâ*, at any time of the year. We do not mean to say that the money which changes hands on the course might not be much more effectively employed in the improvement of horses, or that it might not be practicable to effect modes of rapidly realizing or investing without the concomitant of gambling. All we wish to illustrate is, the fact, that innumerable classes of wagers are mixed up with the transactions of society, from those which are essential to its existence, through those which are of mixed harm and good, up to those which are but dubious in their very best cases.

A wager is fairly laid when the odds are proportional to the probabilities of the event happening or failing. Thus if it be four to one against the happening of an event, the better who bets that it will not happen should offer four to one. In the long run such an event will fail four times where it happens once, and the better will receive a pound four times for every occasion on which he pays four pounds once. But suppose a person should continually offer only three to one upon a contingency on which it is four to one he wins. In the long run he will, upon every five bets, receive one pound four times, and pay three pounds once; he will therefore win one pound on every five bets. Algebraically thus:—let the odds for his winning be a to b, while these which he offers are m to n; in $a+b$ trials, one set with another, he will win n pounds a times, or £na, while he will lose m pounds b times, or £mb. If na equals mb, the wager is fair on both sides; if na be greater than mb, it is unduly favourable to the better; if na be less than mb, it is unduly against him.

There are many cases in which doubt may arise as to whether a wager is fair, and also as to how it is to be interpreted. With respect to the latter, it is or ought to be clear, that if both parties understood the wager in one sense, that one sense is the fair interpretation: but that if either of the parties understood the wager in one certain sense, and the other party knew that he understood it in that sense, no subsequent attempt at a different interpretation should be admitted on the part of that other party. We are told that this rule is widely departed from; and that under cover of adherence to literal signification of words, interpretations are permitted which offer inducements to what we must call attempts at fraud. Thus, it is said, that when the better undertook to run across a bridge in an incredibly small time, and had his bet accepted, he was permitted to win by running from one parapet to the other, which was held to be crossing the bridge, in the same manner as going from one footpath to the other, is held to be crossing a street. Here it is clear that the party accepting the bet understood that the other was to cross the water upon the bridge, which is the true meaning of going across a bridge; and it is also clear that the better knew he was taken in that sense. An adherence to the literal meaning of a wager is, of course, necessary in all cases of doubtful meaning, but there is no language in which the literal meaning of a sentence is always made up of those of the words put together.

A wager is not fair unless the point in doubt is clearly the same to both parties, and there is no concealed knowledge in the possession of either. The latter is included in the former, as an instance will show. John bets Thomas that the ship Hope is arrived in dock from Jamaica before the time at which the bet is laid; his manner implies that he has formed the conclusion from his knowledge of the time at which the Hope was to sail, of the properties of the vessel, of the prevailing weather, &c.: if his manner tell truth, the wager is fair. Or his manner implies that he may be in possession of particular information, that he may have seen the captain, &c.; it says, 'Mind, I do not tell you what my reasons are, all I tell you is the fact:' still the wager is fair. If Thomas dispute, he knows in either case what he disputes, be it the question of the Hope's rate of sailing, or the goodness of John's inference from his particular knowledge. But if John, actually knowing of the Hope's arrival, should lead Thomas into a wager on the probabilities of the ship having arrived, when he knows that it actually has arrived, the wager is unfair. In all matters of skill, indeed, the mere offer of the wager is an assertion of skill, and the acceptance of the wager is the denial of this assertion: this is understood, so that there is no occasion for the party who offers the wager to make any declaration of skill, other than is implied in the wager itself.

There is one case, and that a common one, in which the immorality of the wager is not easy to expose, though it is, we think, sufficiently certain: it is where a person, by offering different wagers to different people, secures himself a certainty of gain, let the event happen which way it will. Thus, one of three things must happen, A, B, C. a person bets 4 to 4 against A, 5 to 4 against B, 6 to 4 against C, with three different persons: he must win 8, for two of his opponents must lose: he cannot pay more than 6, for one only can win; he is therefore, on the most unfavourable supposition, a gainer of 2. As against each of his opponents the wager may be fair: these may not be known to each other, and each one may consider that he has the best of the wager. Whom then does he injure? If it be admitted that a man has a right to lay any bet which he can get taken, provided the event betted on be perfectly understood, he can then injure no one, and no exception can be taken to the proceeding. But if it be not allowed that a man has a right to lay any odds, except those which, to the best of his knowledge and belief, represent the state of the chances, he must then offer a bet which he believes to be unfair, to some one or other of the preceding persons. By betting 4 to 4 against A, he declares his belief that the chance of A's arrival is $\frac{1}{2}$: similarly by betting 5 to 4 against B, he declares his belief that the chance of B's arrival is $\frac{4}{9}$. Consequently he implies a declaration that his belief of the chance of C's arrival is—

$$1-\frac{1}{2}-\frac{4}{9} \text{ or } \frac{1}{18}.$$

Consequently he ought to lay 17 to 1 against the arrival of C, whereas he lays 3 to 1 or 6 to 4. He is then telling contradictory stories to different people, and is saved from conviction only by the fact of each party not knowing what he has stated to others. If there were a possible mode of fighting in which the weapon of each opponent should be armour against those of the rest, we imagine it would not be considered either brave or honest that a man should provoke the combat with several enemies, in such a manner that he should be sure to kill, and sure not to be killed: and we suppose that if wagering be permitted at all among men of honour, it is under the idea that he who makes another risk his money also risks his own.

This possibility of securing certain gain by betting against belief (for against belief it must be) seems to us to be enough, were there no other reason, to show that a wager is not right, unless the odds really represent the opinion of the better: for to maintain that such a wager is a fair one, is also to maintain that it is fair to make others meet risk without sharing it.

WAGER (Law), a bet; something staked by each of two parties in support of his own opinion concerning a future or an unknown event. The party whose opinion proves correct receives what has been staked by both. Wagers generally are not illegal, and the amount won may be recovered in a court of law. Indeed where a feigned issue is directed by the Court of Chancery, that is, where that court sends a question of fact to be decided in a court of common law, the practice has been that the pleadings between the parties should state that a wager had been laid between them as to the matter of fact in question; and the court of common law tries the question so raised. The legality, under certain restrictions, of wagers seems to have been recognised from a very early period, and the same doctrines respecting them prevailed also in the civil law. The character of those restrictions was inquired into and explained at some length by Lord Mansfield in the case of Da Costa *v.* Jones. (Cowp., [illegible]) That was a case which not only excited great interest in this country, but also 'made a great noise all over Europe,' being a wager laid for the purpose of ascertaining the sex of the Chevalier d'Eon. His lordship there seems to have regretted that wagers had ever been treated in courts of law as legal contracts, but still laid it down distinctly that 'Indifferent wagers upon indifferent matters, without interest to either of the parties, are certainly allowed by the law of this country, in so far as they have not been restrained by particular acts of parliament.' He further stated however, that no wagers were legal which operated as an incitement to a breach of the peace, or of morality, or were contra bonos mores, or affected the feelings or the interests of a third party, or disturbed the peace of society: to these may be added, or such as are against public policy, or involve exposures prejudicial to the realm. The court held in that case that the wager was illegal. The whole subject was again very fully discussed in Good *v.* Elliott, 3 T. R., 69, 3. Judges moreover, though they have not the power absolutely to refuse the trial of a cause depending on a wager, have in some instances postponed it, especially where the wager was upon a trivial or ridiculous matter. In addition to these restrictions arising on general grounds of law, certain wagers have been absolutely prohibited. By the 7 Ann. c. 16, all wagers concerning the existing war with France were declared void. By the 9 Ann. c. 14, all securities, &c. for wagers on gambling transactions are declared void; and wagers for more than 10*l.* on games of chance, &c. are made illegal, and subject the winners to certain penalties. This last provision has been held to apply to horse-races. Formerly, while the stat. 13 Geo. II., c. 19. which prohibited horse-races for a less amount than 50*l.* was in force, all wagers on the subject of such horse-races were illegal; but that statute has been repealed by 3 & 4 Vic., c. 5. Moreover a wager of more than 10*l.*, made after a race has concluded, as to which horse has actually won, has been held not to be illegal, being a wager not on the race itself, but on the accuracy of knowledge of the parties concerning it. (Pugh *v.* Jenkins; 1 A. & E., N. S., 63.) Where the amount of an illegal wager has been deposited in the hands of a stake-holder, it may be recovered back from him by the party depositing it, provided the stake-holder has notice of the claim before he pays it over. If however he has paid it over without notice of claim or dispute, he is no longer responsible for it; and if in such case the payment has been made with the consent of the loser, he cannot afterwards recover the money from the winner.

In this term (Trinity, 1843) a case came on for the consideration of the court of Queen's Bench upon demurrer as to a wager made by the defendant, an articled clerk to an attorney, and about to undergo the usual examination previous to admission as an attorney, that he would not pass his examination. The wager was for eight bottles of wine, and the declaration alleged that the defendant had passed his examination, &c.

The judgment of the court was delivered by Lord Denman in these words:—

'It is a pity our time should be occupied with such stuff; but it seems to me that the bet is a bad bet, because the defendant had the event in his own command (by not going through his examination), as 10 to 1 not to go to St. Paul's would be bad. It is absurd.'

WAGER OF BATTLE. [APPEAL; TRIAL.]

WAGER OF LAW was a mode of trial where the defendant was permitted, as it was said, 'to make his law,' that was, 'to take an oath (for example) that he oweth not the debt demanded of him upon a simple contract, nor any penny thereof;' 'but he ought to bring with him eleven persons of his neighbours that will avow upon their oath that in their consciences he saith truth; so that he himself must be sworn de fidelitate, and the eleven de credulitate.' This form of trial was not allowed save when the debt arose by word only, and might have been satisfied in secret without witnesses: it was not permitted as to any debt arising on specialty, or where a contempt, trespass, deceit, or injury was supposed in the defendant; but only in some cases, in debt, detinue, or account; and also in a real action where the tenant alleged that he was not legally summoned. Neither was it permitted to an infant, nor to a person outlawed or infamous, nor in a suit on behalf of or for the benefit of the king, nor to executors or administrators in matters relating to the debts of their testator. Where admitted however, it was conclusive, and barred the party for ever. This mode of trial seems to have existed at a very early period in the history of nations. It was part of the law of Moses, that 'If a man deliver unto his neighbour an ass, or an ox, or a sheep, or any beast to keep, and it die, or be hurt, or driven away, no man seeing it; then shall an oath of the Lord be between them both that he hath not put his hand unto his neighbour's goods, and the owner of it shall accept thereof, and he shall not make it good.' (*Exod.*, xx. 10.) The practice of trying by the oaths of the parties to a suit prevailed in the civil law, where either of the parties might refer the matter to the oath of his adversary; and if he did not accept it, or justify his refusal of it, the judge decided against him. The whole proceeding is prescribed at length in *Cod. Justin.*, 4, 1, 12. The clergy also in the earlier ages were generally admitted to this mode of defence. In this country it early gave dissatisfaction. Men's consciences, as Lord Coke says, 'grew so large,' that the presumption of law that no man would forswear himself ceased to be much relied on. Other forms of actions were brought, such as assumpsit and trover, in which the wager of law could not be had; and eventually, by 3 & 4 W. IV., c. 42, s. 83, the whole proceeding was abolished. (1 *Inst.*, 294 b, 295 a; 3 Bl., *Com.*, 341.) [TRIAL.]

WAGER-POLICY is a name given to a policy of insurance made by persons having no interest in the event about which they insure. Such insurances, formerly common, were found to be 'productive of many pernicious practices.' and therefore the statute 19 G. II., c. 37, was passed, by which it was enacted that no assurances should be made on any ship belonging to his Majesty or any of his subjects, or on any goods, &c. laden on board, 'interest or no interest, or without further proof of interest than the policy, or by way of gaming or wagering, or without benefit of salvage to the assurer; and that every such assurance shall be null and void to all intents and purposes.' [INSURANCE.]

WAGER, SIR CHARLES, ADMIRAL, was born in 1666. He was appointed captain of a fireship in 1692, and was promoted in 1697 to the command of a ship of war. Having been sent out in 1707 to the West Indies as commodore, in May, 1708, with only four ships of war, he attacked seventeen Spanish galleons, which were sailing close along shore from Carthagena to Porto Bello in South America. The battle began at sunset. Soon after dark the Spanish admiral's ship blew up, and the cargo, which was very valuable, was entirely lost. About two in the morning the rear-admiral struck his colours. The vice-admiral escaped in a shattered condition, and some of the other galleons were saved by running them behind a dangerous shoal off Carthagena. More property was lost than taken, yet Commodore Wager's share of the prize-money was said to have amounted to 100,000*l.* For his conduct in this action he was knighted by Queen Anne, and promoted to the rank of rear-admiral.

Sir Charles Wager afterwards commanded a fleet in the Mediterranean till the peace of Utrecht in 1713, when he was made vice-admiral, and was also elected a member of the House of Commons. In 1726 he was sent with a squadron to the Baltic, to keep the Russians in check and to support the Swedes and Danes, and completely effected the objects for which he was sent out. In 1731, having been advanced to the rank of admiral, he escorted Don Carlos, the infant of Spain, to Leghorn, and was soon afterwards appointed First Lord of the Admiralty.

Sir Charles Wager and Lord Sundon had been the representatives of the city of Westminster in the parliament which terminated in 1741, and it was expected that they would have been triumphantly re-elected; but Admiral Vernon and Mr. Edwin were proposed by the opposition, and in the meantime Admiral Wager was summoned by the king to convoy him to Holland. The contest was severe, and the tumult so great on the day of election, that Lord Sundon imprudently got the magistrates to sanction the calling out of a party of soldiers, and while the military surrounded the hustings, the high-bailiff returned Lord Sundon and Sir Charles Wager as duly elected. The return was opposed in the new parliament, the new members were unseated, the magistrates were summoned before the House to be reprimanded, and a resolution was passed that the presence of armed soldiers at an election of members of parliament is a manifest violation of the freedom of election, and an open defiance of the laws and constitution.

In 1742, on the defeat of Sir Robert Walpole's ministry, Sir Charles Wager resigned his office of First Lord of the Admiralty, which he had held about nine years. He died at his house at Chelsea, June 4, 1743, and was buried in Westminster Abbey.

Sir Charles Wager had some reputation for mathematical and physical knowledge, and had devoted a good deal of attention to ship-building. In private life he was much esteemed; his political influence was considerable, and he died with a character more unblemished than falls to the lot of most public men.

(Coxe's *Memoirs of Sir Robert Walpole; Pictorial History of England*; Charnock's *Biographia Navalis*.)

WAGES are the price paid for labour. The labour of man, being an object of purchase and sale, has, like other commodities, a natural or cost price, and a market price. Its natural price is that which suffices to maintain the labourer and his family, and to perpetuate the race of labourers. The rate of wages cannot be permanently below this natural price, for if in any country labourers could not be maintained, they must cease to exist; they must be exterminated by famine, or be removed to some other country. If the price paid were only sufficient to maintain the labourer himself, without any family, he would be unable to marry, or his children would die of want. By these distressing causes the supply of labour would be reduced until the competition of employers had raised the price of labour to its natural level. But although the natural price would thus appear to be that which only wards off starvation, there is, happily for mankind, a principle which tends to raise it to a much higher standard. Every man desires to improve his condition, to enjoy more of the comforts and luxuries of life than have fallen to his lot, and to raise himself in the estimation of others. If he has accomplished this, he acquires habits of living which it is painful for him to forego. He endeavours to bring up his children with the same views and habits as his own, and feels it a degradation if they fall below the standard which he has himself attained. The necessary consequence of this tendency to social improvement is to cause prudence and forethought in marrying, and undertaking the support and settlement of a family. If a labourer had been accustomed to abundance of nourishing food, to decent clothing, and to a comfortable home, he would be restrained from marriage by a fear of losing these comforts himself, and of bringing want upon his wife and family. He would thus be induced to defer the responsibilities of marriage until he should be better able to bear them. This is a sound and wholesome principle as regards an individual, and is conducive to the welfare of himself and his family. It is not less advantageous to society at large, and to the class of labourers in particular. The sufferings and demoralization of poverty are avoided, and the population being restrained within reasonable limits, the supply of labour does not exceed the demand. A labourer cannot have too many wants. He should desire good food, good clothing, a cleanly and comfortable home, and education for his children. If the standard of wants could be universally raised, the natural price of labour would rise in proportion; for if each labourer were determined not to render himself unable to gratify these wants, all could command the wages that would supply them. The degree in which this principle operates determines the natural rate of wages and the condition of the working classes. Where it has no influence, as in Ireland and many parts of Asia, the wages are only sufficient to support life upon the commonest food, and to provide the most squalid clothing and habitations. In more civilized countries, the wants and prudence of the middle classes extend lower in the scale of society, and the labourers want more and enjoy more of the comforts and decencies of life. Happy indeed is that country in which the natural price of labour is the highest! In investigating the principles of population in reference to wages and to the condition of the labouring classes, Mr. Malthus did no more than apply the common and recognised maxims of individual prudence to the social state of the poor. He laid down rules for their guidance, which every richer man would require to be observed by his children; and yet he has been ignorantly and vulgarly defamed by many of that class who have only acquired and maintained their present station by acting upon the very principles which he neither suggested nor discovered, but the consequences of which he has only more scientifically explained.

The general market-rate of wages depends upon the ratio which the capital applied to the employment of labour bears to the number of labourers. If the ratio be great, the competition of capitalists must raise wages; if small, the competition of labourers amongst each other, for employment, must reduce them. Wherever the accumulation of capital is proceeding more rapidly than the increase of population, wages will be on the increase, and the condition of the working classes will be continually improving; until some check has been given to the increase of capital, or until the growth of population (which is naturally encouraged by high wages) has altered the relative proportion of capital to labourers, and reduced the market-rate of wages to the natural rate. While the general rate of wages is regulated by these causes, there are various circumstances which, by increasing or decreasing competition for employment, tend to raise or depress the wages paid to persons engaged in particular occupations. Some of the principal of these are:

1. The agreeableness or disagreeableness of the employments.

2. The easiness or cheapness, or the difficulty and expense of learning them.

3. Their constancy or inconstancy.

4. The small or great trust that must be reposed in those who carry them on.

5. The probability or improbability of succeeding in them.

It is not uncommon to hear these circumstances stated as the direct and immediate causes of high or low wages in particular employments; as if in some cases employers voluntarily gave high wages, or the labourer could command them merely on account of the nature of the employment. But the relation of supply to demand will influence wages in particular employments, as it does the price of labour generally, and of other commodities; and the circumstances stated above will obviously tend to increase or diminish the number of competitors for particular employments. More will naturally seek an agreeable trade, easily learned, than one of a disagreeable character and difficult to learn. All descriptions of skilled labour bear a higher price than unskilled labour. The expense of acquiring the knowledge of any art or trade would not be acquired at all, unless the person who had incurred it were better remunerated than others who have nothing to offer except their natural strength and intelligence, which is common to all men: but many cannot incur the expense of learning a trade if they would; others are too indolent, too careless, or too awkward; and thus the class of skilled workmen are not open to the same unlimited competition as other classes of labourers, and are in a condition to command higher wages. Wherever uncommon skill, talent, or other advantages are required, the number of persons actually practising and living by an employment must be comparatively limited. Most persons are deterred from attempting to learn it by the fear of failure, and many who attempt it do not succeed in gaining their livelihood by it. The few who are really successful can thus command an extraordinary reward for the exercise of their peculiar talents or acquirements. The world will enjoy the advantage of them at any price, not being satisfied with any less degree of excellence. Even if an unusual influx of skilled labourers into any employment should lower the rate of wages, this lower rate is not likely to continue very long, as the superfluous number would seek other employments which offered a higher reward. This result is facilitated by the fact, that the ordinarily high price of skilled labour causes a much more expensive mode of living, and thus raises the natural rate of wages of skilled labourers; or, in other words, induces them to regard as necessaries a variety of comforts which are beyond the reach of common workmen.

Wages are usually calculated in money, and are called high or low according to the money price actually paid: but the condition of the labourer is obviously affected by the price of commodities as well as by the amount of his wages. If the necessaries of life be cheap, low money wages will maintain him in comfort; if they become dearer, higher wages will not improve his condition, but will leave him as he was. Hence it becomes a most important object to inquire whether the price of provisions affects the rate of wages. The disputes which have arisen upon this question would seem to be chiefly caused by attempts to apply a universal law to countries and employments under totally different circumstances. Some contend that as wages are regulated by supply and demand, the price of provisions cannot affect them; while others maintain that the average prices of labour and of food must always, for long periods of years, conform one with the other. It is evident, at the outset, that the former are speaking of the market rate of wages, and the latter of the natural rate; and if this distinction be borne in mind, the two propositions may easily be reconciled. If the market rate of wages be high, it is because the demand for labour is greater than the immediate supply. A fall in the price of provisions could not then lower the rate of wages, because the supply of labour would still be the same; but if the fall were permanent, the condition of the labourer would become so easy, that population would increase, and the supply of labour would be more abundant. The market rate would thus be brought down to the natural rate, unless capital should be increasing in the same proportion as the supply of labour; and any increase in the price of food must then check the growth of population, limit the supply of labour, and ultimately raise wages. There is the same tendency in the market price of labour to conform to the natural price, as there is in the market value of commodities to conform to their real value. Both labour and commodities are equally capable of increase and diminution, and the varying causes which encourage or check production adjust the proportion between the natural or cost price and the market price. But in some countries the market rate of wages may be very much above the natural rate, and in others nearly the same. In one country capital may be increasing more rapidly than population, and in another not so fast. It is clear that a rise or fall in the price of food cannot influence the rate of wages alike in all these countries. Where the wages are high, and capital is rapidly accumulated, any reduction in the price of food and other commodities is a clear gain to the labourer, and can have only a very remote, if any, effect in lowering wages; but where wages are already reduced to the natural rate, and capital is not increasing faster than population, wages will undoubtedly rise and fall with any permanent increase or diminution in the cost of subsistence.

The question is further affected by the differences which exist in the natural rate of wages in various countries. Where the natural rate is so low as only to afford the bare means of existence, the least rise in the price of food must be fatal to numbers of the labouring population, and, by thus limiting the supply of labour, must raise its price; but where the natural rate is high, the labourers suffer indeed from a rise in the price of food, but their existence is not endangered, the supply of labour is not diminished, and their wages consequently do not rise. From these circumstances it is evident that the precise condition of a country in respect to capital, population, and wages must be ascertained before it can be determined whether the price of food will affect the money rate of wages. It may however be generally affirmed, that in proportion as the market rate approaches to the natural rate, and the latter to the mere cost of the commonest subsistence, will the price of the necessaries of life affect the rate of wages.

When the causes which regulate the price of labour are understood, the folly and injustice of any legislation to fix the rate of wages are obvious. The seller of an article will always endeavour to obtain a high price for it, which the purchaser will only give if he be unable to obtain it for less. Labour is the most important object that man has to buy or to sell. Each will make the best bargain he can, and in this no law ought to restrain him. Laws may purpose to affect wages either directly or indirectly. Direct interference with the rate of wages has been frequently resorted to. By several acts of parliament a legal rate of wages in particular employments was ordered to be settled, from which any deviations either on the part of the employer or labourer were punishable. (See 25 Edw. III., stat. 1; 34 Edw. III., c. 11; 13 Rich. II., c. 8; 11 Hen. VII., c. 22; 5 Eliz., c. 4; 1 James I., c. 6.) Unless all the causes of high or low wages already explained be visionary, it is plain that no law can overrule them and establish a legal rate different from that which natural causes would have produced. It may embarrass the operations of trade, and mischievously disturb the freedom of the labour market; but it cannot attain its immediate end—a compulsory rate of wages. The experience of this fact has long since put an end to any such legislation in this country; but the indirect effect of laws upon wages is still felt. The most pernicious interference with wages ever effected by the indirect operation of a law, resulted from the mode of administering the laws for the relief of the poor. Before these laws were altered in 1834, it was the practice in most parishes, especially in the south of England, to give relief from the poor-rate to labourers in proportion to the number of their children. The effect of such a system of relief was to remove the ordinary inducements to prudence in regard to marriage, and even to encourage improvidence. The farmers, taking advantage of the addition made to wages from the poor-rate, offered lower wages than would have sustained a family, and the labourer accepted them, because he was indifferent whether he received his pay from his employer or from the parish. The rate of wages thus became fixed, in agricultural districts, so low as barely to support an unmarried labourer; and as the parish would maintain a family, every man saw that by remaining single he would have no chance of improving his condition, and that by marriage he would be equally well and often better provided for. This system of relief injuriously affected both the market rate and the natural rate of wages. The market rate was completely disturbed; for a man was paid not according to the value and demand for his services, but in proportion to the number of his family. The natural rate was continually undergoing depression, because marriages being encouraged without reference to the sufficiency of wages to support a family, population was extraordinarily promoted. At the same time, the property destined to support it was suffering diminution, by being taxed heavily for the payment of comparatively unproductive labour.

The only sound mode of raising wages and improving the condition of a people is to promote and encourage the increase of the general wealth of a country [WEALTH], by every means which legislative science points out as best suited to that end; and at the same time to remove obstructions, and give facilities to the moral and intellectual improvement of the working classes. By these means capital will be increasing with the natural growth of population; while the labourers, with better habits, will be less prone to reckless improvidence, and consequently not so likely to outrun the increase of capital.

It is not unusual for persons in particular employments to desire higher wages, and to enter into combinations against their masters in order to obtain them. Such combinations were formerly prohibited both by the common and statute law of this country; but since the 5th Geo. IV., c. 95, if unattended with violence or intimidation, they are not unlawful. Unless he has bound himself by a contract, every man has a right to give or withhold his own labour as he pleases; but he has no right to prevent others from disposing of their labour. But the only mode of rendering a combination effectual is to exclude fresh workmen, which frequently can only be done by molestation and threats, which are subversive of the freedom and peace of society. Strikes, temperately conducted, cannot in principle be condemned: being often a necessary protection to the working classes. When masters are not dealing fairly with their workmen, the fear of a strike may often control them; especially as, when acting unjustly, they would find a difficulty in obtaining new hands. But where the cause of a strike or combination is not an occasional dispute concerning wages, but an attempt to limit the number of workmen by compulsory regulations and bye-laws, and to dictate to their employers, it is injurious to trade, and ultimately to the parties themselves. To the labouring classes at large such combinations cannot be beneficial. Whenever they are successful, it is by excluding many competitors, who are, of course, injured by the exclusion. The labour market must become clogged by a mass of exclusive trades, which render it difficult to find employment. The injury suffered by trade in consequence of the artificial limits to the supply of labour and the unnaturally high wages, must also have the effect of diminishing capital, and consequently the means of employing labour.

(Adam Smith's *Wealth of Nations*; Ricardo's *Political Economy and Taxation*; M'Culloch's *Principles of Political Economy*; Malthus, *Essay on Population*.)

WAGTAILS, *Motacillinæ*. The views of zoologists with regard to the place of these birds in the system will be found in the article SYLVIADÆ. They are an active, graceful race, tripping it along the smooth shaven grass-plots, edges of ponds, and sandy river-shores in unwearied search for their insect-food, and with tails which never cease to vibrate as long as their restless little bodies are in action.

Geographical Distribution of the subgenus.—The Old World only. Europe, Asia, and Africa. At least the form does not appear to have been hitherto detected in America, and that continent has now been much searched by zoologists.

The genus *Motacilla*, as it was left by Linnæus, in his last edition of the *Systema Naturæ*, comprised the following species:—*luscinia, calidris, modularis, schœnobenus, campestris, curruca, hippolais, salicaria, sylvia, ficedula, alba, flava, tiphia, stapazina, œnanthe, rubetra, rubicola, atricapilla, pennsylvanica, chrysoptera, coronata, senegalensis, varia, capensis, icterocephala, dominica, canadensis, maderaspatana, aurocapilla, petechia, dumetorum, cinnamomea, caparata, phœnicurus, erithacus, guira, suecica, sialis, fulicata, cayana, velia, canadensis, cœrulea, sibilla, rubecula, troglodytes, calendula, regulus*, and *trochilus*.

Here we find assembled with the true Wagtails, the Nightingale, the Redstart, the Robin, the Wren, the Whitethroat, the Black-cap, the Stonechat, the Blue-bird, the Hedge and other warblers, and the Golden-crested Wren.

It may well be supposed that many a group, not to say family, has been formed at the expense of this genus *Motacilla;* and in the course of this work the arrangements of more modern ornithologists will be found under the title SYLVIADÆ, and the various articles dedicated to the WARBLERS.

In the present article we propose to restrict ourselves to the *True Wagtails*.

These have been thus subdivided by Cuvier:—

Les Hochequeues (*Motacilla*, Bechst.).

The Wagtails, according to Cuvier, join to a bill still more slender than that of the *Fauvettes*, a long tail which they elevate and depress incessantly, lengthened legs, and, especially, scapular feathers long enough to cover the end of the wing when folded, which gives them a certain degree of approximation to the greater part of the Waders. The following are Cuvier's subdivisions:—

The Wagtails properly so called, or *Lavandières*. (*Motacilla*, Cuv.)

These have still the claw of the hind-toe curved like the other *Bec-fins*. They live near the water-side.

Example, *Motacilla alba*.

The Bergeronettes. (*Budytes*, Cuv.)

The *Bergeronettes* have, with the other characters of the *Lavandières*, the claw of the hind-toe elongated and but little arched, which approximates them to the Pipits (*Anthus*, Bechst.; TITLARKS) and the true LARKS. They haunt pastures and seek for insects among the flocks, whence their French name.

Example.—*Motacilla* (*Budytes*) *flava*.

The genus *Motacilla* thus limited, including the subgenus *Budytes*, may be thus characterized:—

Bill slender, nearly straight, cylindrical, the upper mandible angulated between the nostrils, and the tip laciniated. Scapulars long. Hind-claw nearly straight, shorter than the toe. Tarsi rather long. Tail lengthened.

EUROPEAN WAGTAILS.

Example.—*Motacilla alba*, Linn.; the *Pied Wagtail*.

Description.—Spring Plumage.—Male.—Forehead, cheeks, sides of the neck, and lower parts pure white; occiput, nape, throat, breast, feathers of the middle of the tail and its upper coverts deep black; back and sides ash-colour, coverts of the wings blackish bordered with white; the two external tail-feathers white. Length rather more than seven inches.

Female.—Forehead and cheeks of a less clear white; the black patch on the occiput less, and the borders of the wing-coverts verging to grey.

Complete Winter Plumage.—Throat and front of the neck pure white, spotless; on the lower part of the neck a deep black band, the sides of which ascend towards the throat. The ash-colour of the upper parts less deep than it is in summer.

Young.—Lower parts dirty white; on the breast a crescent, more or less large, of a brown ash-colour. In autumn the young begin to put on the livery of the adults; those of the second hatch quit our climates, says M. Temminck, in their youthful garb, and even come back sometimes in the same state at the return of spring. In this state it is the *Motacilla cinerea* of Gmelin, *Sylvia cinerea* of Latham, and *Bergeronette grise* of Buffon. (Temm.)

Geographical Distribution.—Common and stationary over the whole of the southern part of the European continent, remaining during winter dispersed over the southern counties of England. 'Yet,' says Mr. Gould, in continuation, 'we learn from Mr. Selby and Bewick, that, even as far north only as Durham, it migrates southward in October, and does not again make its appearance till the following March; and Mr. Low, in his "Natural History of Orkney," tells us that it continues there the shortest time of any of the migratory birds that come to build, and is never to be seen after the end of May. It is also known to migrate still farther north; but, as might be expected, the higher the degree of latitude attained, the shorter is the duration of the visit.' (*Birds of Europe.*)

The same author however, in the 'Magazine of Natural History' (1837), thus writes of the genus *Motacilla*:—'While engaged upon this tribe of birds during the course of my work on the Birds of Europe, I was equally surprised to find that the sprightly and Pied Wagtail so abundant in our islands at all seasons, could not be referred to any described species; and that it was equally as limited in its habitat; for, besides the British Islands, Norway and Sweden are the only parts of Europe where I have been able to procure examples identical with our bird, whose place in the temperate portions of Europe is supplied by a nearly allied but distinct species, the true *Motacilla alba* of Linnæus; which, although abundant in France, particularly in the neighbourhood of Calais, has never yet been discovered on the opposite shores of Kent or in any part of England. As therefore our bird, which has always been considered as identical with the *M. alba*, proves to be a distinct species, I have named it after my friend W. Yarrell, Esq., as a just tribute to his varied acquirements as a naturalist.'

Mr. Gould then proceeds to point out the characters by which these two species, as he terms them, may be readily distinguished. The Pied Wagtail of England, he observes, *M. Yarrellii*, is somewhat more robust in form, and in its full summer dress has the whole of the head, chest, and back of a full deep jet black; while in the White Wagtail, *M. alba*, at the same period, the throat and the head only are of this colour, the back and the rest of the upper surface being of a light ash-grey. In winter, he remarks, the two species more nearly assimilate in their colouring: and this circumstance has, in his opinion, been the cause of their having been hitherto considered identical; the back of *M. Yarrellii* being grey at this season, although never so light as in *M. alba*. Additional evidence of their being distinct is, he adds, that the female of our Pied Wagtail never has the back black, as in the male; this part even in summer being dark grey, in which respect it closely resembles the other species. This colouring of the female, Mr. Gould observes, has doubtless contributed to the confusion.

Mr. Yarrell, although he concurs in opinion with Mr. Gould, that these birds are distinct, gives figures and descriptions of both birds in their summer and winter plumage to invite investigation to the subject; and he quotes the Supplement of Temminck's 'Manual,' in which that ornithologist refers to Mr. Gould's figure in the 'Birds of Europe,' and also to that in Werner's Atlas of Illustrations to the 'Manual,' which, Mr. Yarrell says, although there called *Motacilla lugubris*, is certainly our Pied Wagtail. The as representations of varieties of *Motacilla alba*. The Prince of Canino and Musignano, he remarks, has considered our Pied Wagtail to be distinct from *M. alba*, and has admitted it as a species in his 'Geographical and Comparative List of the Birds of Europe and North America.' (*British Birds*, 1838.)

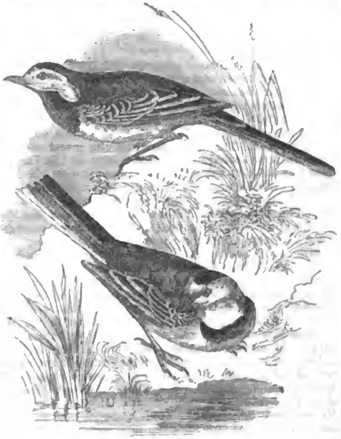
M. Temminck, in the fourth part of his 'Manual' (1840), states, under the head of *Motacilla Yarrellii* (Bonap.), that recent observations upon this black variety, and his certainty that it forms a constant race habitually found in England, where the continental *Motacilla alba* is never seen, determine him to arrange it as a local variety or race, which he characterises as having the wings of a complete black, and all the coverts bordered with pure white. He also details the summer and winter plumage.

Belon thinks that the *Motacilla alba* of the Continent is the κνιπολόγος of Aristotle (*Hist. Anim.*, viii. 3). It is the *Cotremola, Codetta, Codetta di Pecore, Ballarina, Monachina*, and *Cuttretola* of the Italians; *Lavandière* of the French; *Die Weisse Bachstelze* and *Weiss und Schwartze Bachstelze* of the Germans; *Arla* of the Swedes; *Vip-stiert* and *Havre-Sæer* of the Danes; *Erle* and *Lin-Erle* of the Norwegians; *Kwikstaart* of the Netherlanders; *Brith y fyches* and *Tinsigl y gwys* (probably our Pied variety only) of the ancient British; and (our Pied variety) *Dish-washer* and *Washerwoman* of the modern British.

The figure in Belon's folio work, as well as that in the *Portraits d'Oyseaux*, evidently refers to the continental variety. The French names which are placed over the figure in the last-named book are, *Lavandière, Battequeuë, Battelesiue*, and *Haussequeuë*. Below it is the following quatrain:—

> '*La Lavandière* hante le bord de l'eau,
> Hochant tousiours la queuë et le derrière,
> Ny plus ny moins que fait la lavandiere
> Lavant son linge aupres d'un clair ruisseau.'

Habits, &c. of the British Pied Wagtail.—'It is,' says Mr. Yarrell, 'ever in motion, running with facility by a rapid succession of steps in pursuit of its insect food, moving from place to place by short undulating flights, uttering a cheerful chirping note while on the wing, alighting again on the ground with a sylph-like buoyancy, and a graceful fanning motion of the tail, from which it derives its name. It frequents the vicinity of ponds and streams, moist pastures, and the grass plots of pleasure-grounds; may be frequently seen wading in shallow water, seeking for various aquatic insects or their larvæ: and a portion of a letter sent me lately by W. Rayner, Esq., of Uxbridge, who keeps a variety of birds in a large aviary near his parlour window, for the pleasure of observing their habits, seems to prove that partiality to other prey, besides aquatic insects, has some influence on the constant visits of Wagtails to water:—"I had also during the summer and autumn of 1837 several Wagtails, the Pied and Yellow, both of which were very expert in catching and feeding on minnows which were in a fountain in the centre of the aviary. These birds hover over the water, and, as they skim the surface, catch the minnow as it approaches the top of the water in the most dexterous manner; and I was much surprised at the wariness and cunning of some Blackbirds and Thrushes, in watching the Wagtails catch the minnows, and immediately seizing the prize for their own dinner."'



Motacilla alba (British).
Lower figure, winter plumage; upper, summer.

The nest of the British Pied Wagtail is made up of root-fibres, withered grass, and moss; the lining consists of hair and a few feathers. A bank, a hole in some old wall, the thatch of a cart-shed or other farm-building, faggot-piles or woodstacks, and hayricks, are all localities where it is generally placed, and almost always near water; but Mr. Jesse mentions in his *Gleanings* the nest of a Water Wagtail in one of the workshops of a manufactory at Taunton, amid the incessant din of braziers who occupied the apartment. It was built near the wheel of a lathe which revolved within a foot of it, and here the bird hatched four young ones. She was perfectly familiar with the well-known faces of the workmen, and flew in and out without fear of them; but if a stranger entered, or any other persons belonging to the same factory, but not to what may be called her shop, she quitted her nest instantly, and returned not till they were gone. The male however had less confidence, and would not come into the room, but brought the usual supplies of food to a certain spot on the roof, whence it was brought in to the nest by his mate. The eggs are from four to five, white with ash-coloured speckles.

'While the cows are feeding,' says White, 'in the moist low pastures, broods of wagtails, white and grey, run round them, close up to their noses, and under their very bellies, availing themselves of the flies that settle on their legs, and probably finding worms and *larvæ* that are roused by the trampling of their feet. Nature is such an economist, that the most incongruous animals can avail themselves of each other! Interest makes strange friendships.'

The habits of the Continental *Motacilla alba* are similar to those of our Pied variety.

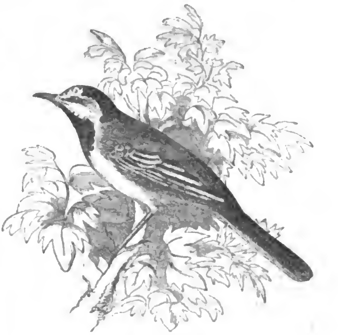
The British species figured and described by Yarrell are four in number:—the Pied Wagtail (*Motacilla alba; Motacilla Yarrellii*, Bonap.); the Grey Wagtail (*Motacilla boarula*); the Grey-headed Wagtail (*Motacilla neglecta*, Gould; *Motacilla flava*, Temm.; *Budytes* of the Prince of Canino's *Comparative List*); and Ray's Wagtail (Yellow Wagtail of Pennant; *Budytes Rayi* of the Prince's *Comparative List*).

ASIATIC WAGTAILS.

Example, *Motacilla alba* (*La Bergeronette grise*); the true or Continental White Wagtail).

Geographical Distribution.—Europe. High lands of India. Africa.

Eggs about six in number, bluish-white spotted with black. Nest very variously placed: in fissures of rocks, in old towers, under arches of bridges, about hollow trees.



White Wagtail of Europe, India, and Africa.

Motacilla speciosa (genus *Enicurus*, Temm.).

Generic Character.—Bill rather strong, lengthened, very straight, abruptly bent and notched. Culmen straight from the base. Gonys thickened, ascending. Rictus bristled. Wings rather short; the three first quills graduated. Tail lengthened, deeply forked. Feet strong. Tarsus lengthened; the scales entire. Middle toe shorter than the tarsus; outer toe longest. Legs pale. (Sw.)

Description of *Enicurus speciosus*.—Crest, lower part of the back, rump, belly, vent, two exterior tail-feathers entirely, and other tail-feathers at their extremity, a broad band extending obliquely across the wings, and the axillæ white; head, except the crest, breast, back, and greatest part of wings and tail black. The white is the purest snow-white; the black is of different shades, more intense on the head and breast, having a slight reflection of dark blue, inclining to purple on the extremity of the wings tinted with brown. A few minute black plumes bound the crest behind and at the sides, extending to the base of the bill. Three or four of the last secondary feathers with a narrow band of white, but the succession not regular. Plumes of the Hypochondriæ elongated and delicately villous. Length of body and head 4¼, of tail 6 inches; of bill, which is black, 10 lines. Tarsi nearly twice as long as the middle toe, pale flesh-coloured with a yellow tint. (Horsf.)

This is the *Chenginging* or *Kingking* of the Javanese.

Locality and Habits.—Dr. Horsfield states that this species in its habits and manners resembles several European species of the genus *Motacilla*. 'It is,' says he, 'found near small rivulets; in the beds of these, particularly where they abound with rocks and gravel, it is seen running along with alacrity, moving its tail incessantly, and picking up worms and insects. It is very locally distributed, and uniformly deserts the neighbourhood of populous villages. It is almost entirely confined to the southern coast of Java, which abounds in small streams, descending rapidly from the southern hills, and shaded by luxuriant shrubs. Here I first discovered this bird, in the district of Pajittan, in the year 1809. I afterwards met with it again along this coast, in the district of Karangbollong, and in the provinces south of Kediri. Among more central situations it frequents the banks of an elevated lake near the declivities of the mountain Prahu, where I found it more numerous than in any other part of Java. In the extensive forests of Pugar and Blambangan I never noticed it, although I devoted a considerable time to their examination.'—(*Zoological Researches in Java.*)

Motacilla (Enicurus) speciosa. (Horsf.)

AFRICAN WAGTAILS.

Example, *Motacilla lugubris* (Pallas); the *White-winged Wagtail; Schwarze Bachstelze* of the Germans.

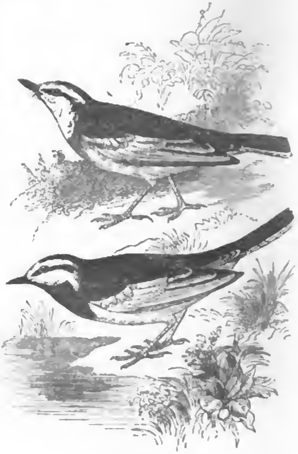
Summer Plumage.—Back of head and neck, line from bill to eye and from eye to hinder part of the head, back, rump, six middle tail-feathers, throat, and chest black; shoulders, tips, and outer edges of the primaries, dark greyish-brown; remainder of wings white, except the tertiaries, which are brown in the centre; bill and feet black.

Winter Plumage.—Upper part of throat pure white; back and scapulars uniform grey, instead of black. (Gould.)

M. Temminck states that individuals which are marked with black and grey on all the upper parts are passing from one state of plumage to the other.

Young of the Year.—Lore and stripe behind the eyes black, but very narrow. Top of the head and all the upper parts, to the upper tail-coverts, grey-ash; nuchal collar very narrow, indicated, in great part, by black spots. Coverts of the wings always pure white. Length of the species about seven inches eight lines. (Temm.)

Geographical Distribution.—Eastern Europe, seldom advancing farther west than the central parts. Russia. Southern Siberia, Egypt. Hungary. The Crimea. Asia Minor probably. Scarce in Italy, Provence, and Picardy. Very common in Japan, especially in winter, where it is called *Sekirei*, and frequents the streams of mountainous valleys.



Motacilla lugubris.

WAHABEES, or, more correctly, WAHHA'BIS, is the name of the adherents of a Mohammedan sect in Arabia. The origin of this sect is intimately connected with the following circumstances. When Sultan Selim I. had conquered Egypt and deposed the last khalif of Cairo, Al-mutawakkel in A.H. 922 (A.D. 1517), he was acknowledged as successor of the khalifs by Berekiat, the grand sherif of Mecca, who presented him with the keys of the Kaaba. From this time the sultans of the Osmanlis were the protectors of the Mohammedan faith, though only recognised as such by the Sunnites; they were the guardians of the holy cities, Mecca and Medina; and they had the privilege and the duty of protecting the numerous caravans of hájis, or pilgrims, which annually travel to Mecca. A Turkish pasha resided at Jidda, and sometimes also at Mocha, and while the fertile provinces of Hejaz and Yemen in Western Arabia seemed to obey the Sultan, the pashas of Baghdád and Basrah made frequent attempts to establish the Turkish authority in the province of El-Hassa in Eastern Arabia. The Mohammedan religion had generally departed from its primitive purity, and was particularly corrupted among the Turks. The Mohammedans had introduced novelties into their religion, which were rather calculated to please the senses, and which found favour among people who have always loved to follow the bent of their imagination. Mohammed gradually received honours like God himself; virtuous men became saints, and the miracles they were said to have performed were eagerly believed by the people; many austere rules of the Korán were forgotten or left to the extravagances 'of a few derwishes and fakirs;' and the places of worship were adorned by the princes and the rich with the arts and luxuries of the East, while the poorer Mohammedans indulged their passion for religious buildings by erecting a rude tomb to some unknown saint, surmounted by a cupola of painted brickwork. To this we must add that the Korán ceased to be the sole source of religious knowledge, and that traditions concerning Mohammed were considered by his disciples as pure and trustworthy as the Korán itself. Although the Arabs had deviated from the rule of the Korán, there was a striking difference between them and the Turks. The Turks used opium and wine; not satisfied with polygamy, they had intercourse with prostitutes; they were addicted to practices against nature, which are strictly prohibited by the Korán, and more than once holy hájís of the Turkish caravans had polluted the sacred cities with their scandalous conduct. The caravans especially, those congregations of pious men assembled for the purpose of performing one of the most sacred duties of their faith, presented a revolting aspect to the simple and uncorrupted believers among the Beduins of the desert. Their leaders gave full licence to debauchery, and although it was generally their riches which tempted the Beduins, and excited them to predatory attacks, it often happened that the Son of the Desert unsheathed his sword indignant at the pride and vices of men who, from the moment they reached Mecca, proudly assumed the holy title of 'hájí.'

Such was the state of the Islám, when, in the beginning of the last century, a Mohammedan sheikh conceived the project of reforming the religion of Mohammed, and restoring it to its primitive purity.

This sheikh was 'Abdu-l-Wahháb ('the servant of Him who gives (us) every thing'), who, according to Burckhardt, was born at El-Hauta, a village five or six days' journey south of Der'aiyeh, the capital of the province of Nejd, on the road from this town to the district called Wádi Dowásir. In the life of 'Abdu-l-Wahháb, in the 'Universal Biographical Dictionary,' his birth-place is called 'Al-Aynah, in Nejd; and in the 'Annals of the Turkish Empire,' by Izí, Constantinople and Skutari, A.H. 1198 (A.D. 1784), p. 207, *in fine*, it is called Aiyineh, which seems to be El-Ayeyneh, near Der'aiyeh. Scott Waring calls it Ujunu, a bad orthography for Ajana. 'Abdu-l-Wahháb was born at the beginning of the twelfth century of the Hijra, which corresponds to the end of the seventeenth century of our æra. His father was the sheikh or chief of the Benî Wahháb, a branch of the great tribe of Temím, which occupies a considerable part of Nejd. 'Abdu-l-Wahháb received his education in the schools of Basrah, where he studied divinity. He made the usual pilgrimages to Mecca and Medina, and he lived several years at Damascus, where he had frequent disputations with the divines on religion, but as he displayed great zeal in the abolition of abuses, his doctrine was considered as schismatic, and being exposed to persecutions, he fled to Mosul. After some time he returned to Arabia, but the doctrines which he preached to the natives, and his violent attacks on Turkish tyranny and vice, became so many causes for new persecutions, and he led a wandering life till he settled at Der'aiyeh, the residence of the sheikh Mohammed Ibn Sa'úd. This intelligent chief listened to the words of the reformer. He became his disciple; he married his daughter; and soon drew his sword to propagate the new doctrine among the tribes of Arabia. Mohammed Ibn Sa'úd thus laid the foundations of a powerful empire on theocratical principles, of which his descendants remained masters for nearly a century.

When Sa'úd, the grandson of Mohammed Ibn Sa'úd, conquered Mecca, he ordered a kind of confession of faith to be published, the substance of which is as follows:—

'Abdu-l-Wahháb's doctrine teaches the salvation of mankind. It is divided into three parts: I., the knowledge of God; II., the knowledge of religion; III., the knowledge of the prophet. In the first part, God, it is said, is one Almighty, and we acquire the knowledge of him by adoring him. The second part, knowledge of religion, is threefold, and contains—1, The Islám, or resignation to the will of God; 2, faith; 3, good works. The Islám contains five things:—1, The belief that there is only one God, and that Mohammed is his prophet; 2, the five daily prayers; 3, alms, one-fifth of the annual income; 4, fasts during the month of Ramazan; 5, the pilgrimage to Mecca. The faith contains six things, viz.:—1, The belief in God; 2, in his angels; 3, in his Holy Scripture; 4, in his prophets; 5, in his divine and perfect qualities; 6, in the day of judgment. Good works are only the consequence of the rule that we should adore God as if he were present to our eyes; and though we cannot see him, we must know that he sees us. The knowledge of the prophet, which is the most important part of Wahhábism, is based on very positive principles. Mohammed, the prophet, was a mortal like all other men, and he preached for all the nations of the world, and not for one only, the Arabs; no religion is perfect and true in all its parts except his, and after him no other prophet will come; Moses and Jesus were virtuous men, though inferior to Mohammed, notwithstanding he was not of divine nature. Those who do not fulfil their religious duties are to be severely punished. The reformed religion shall be propagated with the sword, and all those who refuse to adopt it are to be exterminated. 'Abdu-l-Wahháb not only forbade the adoration of Mohammed and of saints, but he also ordered their splendid tombs to be destroyed, and he declared tradition to be an impure source. He made several other prohibitions concerning social and religious abuses, such as the habit of using wine, opium, and tobacco, the use of the rosary for prayers, and he preached strongly against those unnatural practices which were and are still so frequent among the Turks.

The doctrine of 'Abdu-l-Wahháb was no new religion: it was Mohammedanism reduced to a pure deism, and so little did it deviate from the Korán, that even to the present day many theologians of Syria and Egypt do not venture to say that it is schismatic. Yet this reformer maintained that there had never been any man directly inspired by God, and that there was no scripture or book whatsoever which was entitled to be called divine. Hence it follows that according to 'Abdu-l-Wahháb there is no revealed religion; and if he calls the Mohammedan a divine religion, it is not because he believed that it had been transmitted directly from God to man, but merely on the ground of its perfection.

The reformed Mohammedanism made rapid progress, especially among the nomadic Arabs, or Beduins, who had never adored Mohammed as a divine person, nor viewed the Korán as a divine book, although they considered themselves to be as orthodox Mohammedans as any of the other nations which have adopted the Islám.

The inhabitants of the towns were less inclined to adopt Wahhábism, but Mohammed Ibn Sa'úd nevertheless succeeded in conquering the greater part of Nejd, of which he was the temporal chief, while 'Abdu-l-Wahháb was the spiritual chief. The system of government established by these two men was strictly conformable to the political prescriptions of the Korán, and very like that of the first Khalifs. The chief authority lay in the hands of the temporal chief, but this authority was confined to the direction of important affairs; the governors of the provinces and the under-governors were kept in strict obedience to the orders of the prince, but their authority over the Arabs was not very great. The ulema of the capital, Der'aiyeh, who generally belonged to the clan or family of Sa'úd, formed a council or ministry for religious and legislative affairs, and in time of war the governors used to assemble in Der'aiyeh for the purpose of concerting the plan of the campaign. Trade and agriculture were well protected. The revenues of the Wahhábi empire were composed of:—1. One-fifth of the booty taken from heretics; the four remaining fifths were for the soldiers. 2. The tribute, called 'alms' in the Korán: it was a certain part of the property, which varied according to the nature of the property: for fields watered by rain or rivers it was one-tenth of the yearly produce; for fields watered artificially, one-twentieth only; merchants paid one and a half per cent. of their capital. The Beduins, who had always been tax-free, disliked these 'alms' very much, but they were indemnified by the frequent occasions of plunder. 3. Revenue from the chief's or prince's own estates, and from the plunder of rebellious towns. The punishment for a first rebellion was a general plunder, one-fifth of which belonged to the fiscus; in case of a second rebellion, all the grounds belonging to the town were confiscated and became the property of the reigning chief; and as such rebellions were very frequent, the chief acquired immense estates. The greater part of them were afterwards confiscated by Mehmed 'Ali, the pasha of Egypt. Except a few hundred men who formed the prince's life-guard at Der'aiyeh, the Wahhábís had no standing army, but assembled when the prince designed some expedition. Two or three great expeditions were made every year.

The name of the Wahhábís soon became known in the Turkish provinces adjacent to Arabia. The Turkish government was not aware that this sect had as much warlike and religious energy as the Arabs under the first khalifs, but it is unjust to accuse the diwan, as Rousseau, the French consul-general at Baghdád did, of looking at the memorable events in Arabia 'with a stupid eye, as usual.' As early as A.H. 1161 and 1162 (A.D. 1748 and 1749) Ahmed El-Hájí, pasha of Baghdád and formerly grand-vizír, displayed great activity against the adherents of a famous fanatic, Mohammed Ibn'Abdu-l-Wahháb, whose 'impious doctrine sapped the fundamental principles of Islám, and who set himself up as the head of a new religion.' (Izí, cited above; *Universal Biographical Dictionary*, 'Life of Ahmed Pasha El-Hájí.') The simple fact that, if Wahhábism had become predominant, the sultan would have ceased to be the 'visible' chief of the believers, leads us to conclude that the diwan had never looked with a stupid eye on the religious reform in Arabia.

Mohammed Ibn Sa'úd died in A.H. 1179 (A.D. 1765), and 'Abdu-l-Wahháb died on the 29th of Shawwál, A.H. 1206 (14th of June, A.D. 1787).

The successor of Mohammed Ibn Sa'úd was his son, 'Abdu-l-Azíz, under whom the power of the Wahhábís was extended over the greater part of Arabia and became the terror of Turkey. As early as 1792-93 the Wahhábís made a successful campaign against Ghâleb, the grand sheikh of Mecca.

The provinces of Basrah and Baghdád, adjacent to Nejd, had suffered from the incursions of the Wahhábís from the time of their coming into political power. In 1797 Soliman, pasha of Baghdád, made a fruitless attempt to attack them in the province of El-Hassa; his troops were obliged to retreat, the victorious Arabs overran the neighbourhood of Basrah, and took the holy town of Imám Husein, where they destroyed the famous temple and robbed it of the immense treasures which had been deposited there by the pious generosity of the sultans of the Osmanlis and the shahs of Persia. Another Turkish army, reinforced by a strong body of Arabs from Irák Arabi, entered Nejd in 1801, and was only five or six journeys from Der'aiyeh, when Thoeni, the sheikh of the Bení Montefik and commander of the Arab auxiliaries of the Turks, was murdered by a fanatical Wahhábí. It is said that the other chiefs of the Turks were bribed by 'Abdu-l-Azíz, for they retreated suddenly, but were nevertheless attacked on their march, and the whole Turkish army was destroyed. In the same year, 1801, 'Abdu-l-Azíz, at the head of more than a hundred thousand men, made a fresh expedition against Mecca. Othmán-el-Medhayfah, the brother of Ghâleb, the sheikh of Mecca, joined the Wahhábís, and having been put at the head of a considerable body by 'Abdu-l-Azíz, he took Tayef, a large town east of Mecca, and Konfodah, a port on the Red Sea. The rest of Hejáz was conquered by 'Abdu-l-Azíz, who took Mecca early in 1803, after an obstinate siege. He would have taken Mecca earlier, but for the arrival of the great caravan of Damascus, commanded by the pasha of Damascus, which was allowed to remain in Mecca for three days, after which the Wahhábís entered the town without resistance. They killed many sheikhs and other believers who refused to adopt Wahhábism; they robbed the splendid tombs of the Mohammedan saints who were interred there; and their fanatical zeal did not even spare the famous mosque, which they robbed of the immense treasures and costly furniture to which each Mohammedan prince of Europe, Asia, and Africa had contributed his share. The fall of Mecca was followed by that of Medina in 1804, and the tomb of Mohammed was robbed and destroyed. 'Abdu-l-Mayn, a brother of Ghâleb, was appointed governor of Mecca, but he soon lost his post, Ghâleb, who had fled to Jidda, having bribed the chief of the Wahhábís, and succeeded in being appointed governor on promising to adopt Wahhábism, which he did. Previously to the fall of Medina, and as early as 1803, 'Abdu-l-Azíz was murdered by a fanatical Shiite, a native of Persia; his successor was his eldest son, Sa'úd, whose complete name was Sa'úd Ibn 'Abdu-l-Azíz. Ghâleb, anxious to obtain his former dignity and independence, intrigued against Sa'úd. In the hope of kindling a general war between Turkey and Arabia, from which he might derive advantage, he persuaded Sa'úd to forbid the khotbah, or public prayers, to be said in the name of the Sultan. Sa'úd gave the order, and from that moment the Sultan, in the eyes of the people, ceased to be the protector of the holy towns and the visible chief of their religion.

If during the course of the Thirty Years' War a Protestant army had taken possession of Rome and put a married priest on the seat of St. Peter, the scandal and confusion produced by such an event among the Roman Catholics could not have been greater than the horror and general consternation which spread throughout the East when the people heard that the tomb of the prophet had been despoiled, and that the first temple in the Mohammedan world was in the hands of heretics. The pilgrimages were stopped; from 1803 to 1809 no great caravan ventured to cross Arabia: and from the Atlantic to the banks of the Ganges and the frontiers of China every pious Mohammedan felt deeply grieved at the thought that henceforth he would be prevented from performing a duty which he considered most sacred. Persia was unable to give aid, and the diwan, absorbed by the danger to Turkey from the wars in Europe, was compelled to resignation.

In the time that followed the conquest of Mecca and Medina, Sa'úd, the greatest chief of the Wahhábís, established his authority in the remainder of Arabia, except Hadhramaut and Omán, where he found a formidable adversary in the Imám of Maskat. Sa'úd conquered the whole province of El-Hassa, the islands of Bahrein, and several Arabic towns on the coast of Persia. The Gulf of Persia was then infested by Arab pirates, who, after Sa'úd had taken possession of the greater part of the coasts, were either Wahhábís, or at least made common cause with them. The British commerce in those seas was greatly injured by these pirates, who were severely chastised by the British forces under Captain Wainwright, the commander of the fleet, and Colonel (afterwards General) Sir Lionel Smith. The British troops acted in concert with the forces of the Imám of Maskat, and the war was finished early in 1809.

The very existence of Turkey being menaced by the Wahhábís, who overran Syria and concluded an alliance with Yúsuf, the rebellious pasha of Baghdád, the diwan at last found a man who was able to subject these terrible enemies. This man was Mehmed 'Ali, the present pasha of Egypt.

Mehmed 'Ali made his first preparations in 1809. To save his army from marching round the northern gulf of the Red Sea, he ordered the timber for a flotilla of twenty-eight vessels to be got ready at Bulak, the port of Cairo, whence it was carried on camels to Suez, where the ships were constructed. The commander of the expedition was Túzún-Bey, the second son of Mehmed 'Ali, then eighteen years old, who was seconded by Ahmed Agha, surnamed Napoleon or Bonaparte. Túzún-Bey entered Arabia in 1811; in 1812 he was beaten by the Wahhábís near Medina, but he took this town in the course of the same year, a conquest which was mainly due to the impetuous courage of Thomas Keith, a Scotch renegade, known as Ibráhím Agha, who took the outworks of Medina by storm. Mecca was taken in 1813, and Ghâleb, notwithstanding he had favoured the Egyptian invasion, was made prisoner, and sent to Salonica in European Turkey, where he died in 1816.

In 1814 Sa'úd died, and was succeeded by his eldest son 'Abdullah. The death of Sa'úd was the forerunner of the ruin of the Wahhábís. In 1815 the Egyptians suffered a defeat at Zohrán, but they obtained a signal victory at Bissel. Túzún-Bey paid six dollars for every head of a Wahhábí; and having obtained six thousand heads, he ordered them to be piled up in a pyramid. Peace was concluded during the course of the same year (1815) on unfavourable conditions to 'Abdullah, who sent an ambassador to Cairo, named 'Abdu-l-Azíz, a learned sheikh, whose further negotiations were interrupted by the sudden outbreak of fresh hostilities.

The commander of the new Egyptian expedition was the celebrated Ibráhím Pasha, the son of Mehmed 'Ali, who entered Arabia in 1816. After an obstinate resistance, the Wahhábís retreated to Der'aiyeh in 1818, where 'Abdullah was besieged by Ibráhím. The siege was long, but it was carried on by Ibráhím with skill, boldness, and admirable perseverance till the month of December, 1818, when 'Abdullah surrendered. He and several of his family were sent to Constantinople, and after having been promenaded through the streets for three days, they were beheaded, and their bodies were exposed to the outrages of the mob. The greater part of the territories conquered by the Wahhábís fell under the authority of Mehmed 'Ali.

Thus the power of the Wahhábís was broken, but they were not exterminated. Some of their chiefs resisted the Egyptians in the south-eastern part of Nejd, in El-Yamámah, and in El-Harík, and they occasionally retreated to the countries south of these provinces, which are generally considered to be a barren desert.[*] In 1827 the Wahhábís caused considerable trouble to Mehmed 'Ali; they were probably not without some influence on the inhabitants of Yemen, who opposed such a vigorous resistance to the Egyptians in 1834; and in 1838 and 1839 there were such dangerous symptoms of rebellion in the eastern part of Nejd, that Mehmed 'Ali sent an army there, which made rapid progress. This army was about to conquer El Hassa, and to establish Egyptian authority on the shores of the Persian Gulf, when, by the sudden attack of the Turks on Syria, Mehmed 'Ali was forced to open that campaign which began so unfortunately for the Turks with the loss of the battle of Nizibi, but in consequence of which Mehmed 'Ali was dispossessed of Syria. There was a party in the diwan who, availing themselves of the victories gained by the British troops in Syria, intended to dispossess Mehmed 'Ali of Arabia also; but fortunately they did not succeed. We say fortunately, for if ever Egypt should cease to be ruled by a vigorous government, the Wahhábís would raise their heads: they would overrun Arabia, being weakened neither in numbers nor in fanaticism, and Turkey would be unable to protect the holy towns. The consequences of such an event would produce discontent in the whole East, and the greatest danger to the existence of the Ottoman empire. These considerations will perhaps serve to show that, though young, the Egyptian power is already intimately connected with the history of the East, and that its overthrow would be a vital blow to all those nations that follow the Mohammedan creed.

(Carsten Niebuhr, *Description de l'Arabie*, p. 298, &c. Among European writers, Niebuhr is the first who mentions the Wahhábís; *Voyages d'Ali Bey:* 'Ali Bey was present at the conquest of Mecca by the Wahhábís, and gives an interesting description of their army; Ed. Scott Waring, *A Tour to Sheeraz*, p. 119, &c.; *Description du Pashalik de Baghdád, suivie d'une Notice Historique sur les Wahabis*, by Rousseau, formerly French consul-general at Baghdád. This sketch is interesting, but contains many errors, especially with regard to the doctrine of 'Abdu-l-Wahháb; Mengin, *Histoire de l'Egypte sous le Gouvernement de Mohammed Aly*, Paris, 1823, gives an excellent account of the conquest of Der'aiyeh by Ibráhím Pasha; Burckhardt, *Notes on the Bedouins and Wáhabys.* This is the best work on Wahhábí history till 1815; Sir Harford Jones Brydges, *An Account of the Transactions of His Majesty's Mission to the Court of Persia; to which is appended a brief History of the Wahauby* (in vol. ii.). This is a most valuable account, partly taken from Mengin, cited above, but for the greater part the fruit of the author's own observations during his long residence at Baghdád and other places in the East; Mengin, *Histoire sommaire de l'Egypte sous le Gouvernement de Mohammed Aly*, Paris, 1839. This work contains the excellent observations of Jomard on Arabia, and also a French translation of a short Arabic MS. on the campaign of the Wahhábís in Hejáz against Mehmed 'Ali. The author of the MS. is the sheik 'Aus, who was in the head-quarters of 'Abú-Noktah, one of the principal chiefs of the Wahhábís; Corancez, *Histoire des Wahabis;* the maps of Planat, Berghaus, and Jomard.)

WAHLENBE'RGIA, a genus of plants named after George Wahlenberg, M.D., author of the 'Flora Japonica' and other works. It belongs to the natural order Campanulaceæ, and many of the species embraced in it were formerly included under the genus Campanula. The species consists chiefly of herbs, which are for the most part annual. The leaves are mostly alternate, sometimes opposite, and are generally found in greatest abundance at the lower part of the plant. The flowers are seated on long peduncles, drooping at first, but erect in fruit. The calyx is 3-5 cleft; the corolla 3-5 lobed at the apex, rarely divided to the middle. The stamens 3-5 in number, free, the filaments broadest at the base. The style inclosed, pilose, especially at the upper part; stigmas 2-5. The ovary combined with the tube of the calyx. The capsule 2-5 celled, opening by as many valves as cells at the apex, each bearing a dissepiment in the middle. The seeds very numerous and minute. Above fifty species of plants belonging to this genus have been described. They are most abundant in the southern hemisphere, and are particularly numerous at the Cape of Good Hope. The following are a few of the most remarkable forms presented by the species.

W. graminifolia, Grass-leaved Wahlenbergia, has the stems and leaves clothed with soft down, the leaves entire, the radical ones linear or linear-spatulate, those of the stem linear and somewhat clasping; the bracts ovate, acute, entire, rather downy; the tube of the calyx smoothish, the lobes downy, and the sinuses toothless. This plant is a native of Sicily and of the south of Italy as far as Rome, and of the island of Zante. It has a blue corolla, white filaments, yellow anthers, and the flowers are aggregated together.

W. capensis, Cape Wahlenbergia, has an erect simple or branched stem, pilose at the bottom, the leaves ovato-lanceolate, pilose, unequally toothed; the tube of the calyx ovate, hairy; the corolla 5-cleft, hardly one-half longer than the lobes of the calyx; the capsule ovular and pilose. This plant, with many others of the genus, is a native of the Cape of Good Hope. It has large flowers, with a corolla bluish-green outside, dark blue inside at the bottom, but greenish at the commencement of the lobes; the lobes themselves are violaceous and spotted with black within at the recesses.

W. hederacea, Ivy-like Wahlenbergia, is a glabrous plant with slender ascending stems; the leaves are placed on long petioles, cordate, and bluntly 5-7 angled; the corolla 5-lobed at the apex, four times longer than the lobes of the calyx; the capsule hemispherical. This plant is a native of the west of Europe and of North America: it is abundant in Great Britain in Cornwall and Sussex, and is also found in Epping Forest. It is also a native of Scotland and Ireland. This plant was called *Aikinia hederacea* by Salisbury, in honour of John Aikin, a British botanist. It is the *Campanula hederacea* of Linnæus, who was followed by Smith, Hooker, and others.

W. gracilis, Weak Wahlenbergia, has a simple or branched, glabrous or pilose stem; alternate or nearly opposite, linear-lanceolate, toothed, glabrous leaves; smooth calyx with an ovoid tube; the corolla funnel-shaped, 5-cleft; the capsule obovate. This plant is a native of New Holland about Port Jackson, of Van Diemen's Land, of New Caledonia, and New Zealand. Four or five varieties of this species have been recorded.

W. Cervicina, Throat-wort, is a small plant; the stem much branched, the branches diverging, pilose; the leaves linear-lanceolate, a little denticulated; the tube of the calyx rather pilose; the corolla tubular, longer than the segments of the calyx; the capsule spherical. It is a native of Egypt, also of Senegal, in dry sandy places. Its leaves have white margins. Its flowers are very numerous, solitary from the axils of all the leaves and the tops of the branches.

W. foliosa, Leafy Wahlenbergia, has a woody erect stem, very leafy in every part; the leaves linear-acute, serrated, glabrous or pilose on the middle nerve; the tube of the calyx glabrous obconical, the lobes subserrated; the corolla cylindrical, semi 5-cleft, one half longer than the lobes of the calyx; the capsule turbinate. This plant is one of a group of the species named Nesophila, on account of their inhabiting islands. It is found on the islands of St. Helena and Ascension. It has reddish flowers.

In the cultivation of these plants the seeds of those which are annual should be sown on the hot-bed, and when the plants are of sufficient size they may be placed out in verted into a power-loom factory for stuffs. The most important public buildings are those belonging to the county and West Riding. The Register-Office was established in 1704, for the registry of deeds relating to landed property. The court-house was erected in 1806. The House of Correction is a very extensive pile, constructed on the improved plan of county prisons, and is now being still further enlarged: the number of prisoners confined at one time during 1842 averaged 784, and the number sometimes exceeds 900. The clerk of the peace for the West Riding has his offices at Wakefield. About a mile north-east of the town is the West-Riding Lunatic Asylum, erected in 1817, for 250 patients; but it has been more than once enlarged, and the number of patients now averages 400.

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[*] In the map of Berghaus this region is called Roba-el-Khaly, a name afterwards adopted by Jomard. Robá-l-Khali, that is, 'an empty dwelling-place,' seems to be an unsuitable name for a barren desert: the name was perhaps given to the country after some destructive war. Powerful armies have crossed the Robá-l Khali, as was the case under 'Abú-Bekr, the successor of Mohammed, who ordered 'Omán to be attacked from this side.

Wellsted intended to proceed from 'Omán to Der'aiyeh, but was unfortunately prevented from doing so.

The parish church, erected in 1470, is 156 feet long and 69 wide, with a tower 22 feet wide inside, surmounted by a spire, the total height being 228 feet. The south front was re-edified in 1724; and other parts have been so extensively repaired, that few external remains exist of the original building. The living is a vicarage in the gift of the crown, and the gross as well as net annual income for the years 1828-29-30 was 537*l*. In 1652 a lectureship, now of the value of 100*l*. a year, and in the gift of the Mercers' Company of London, was founded by Lady Camden. A second lectureship, supported by voluntary contributions, was established in 1801. St. John's Church, erected at a cost of about 10,000*l*., was opened in 1795, and was made parochial in 1815. The vicar presents, and there is a bequest of 1000*l*. for endowing the officiating minister. Trinity Church, in the town, was opened in 1839. The livings of Stanley, worth 85*l*. a year, and of Alverthorpe, valued at 72*l*., are also in the gift of the vicar; but the living of Horbury, the average value of which is 225*l*. a year, is in the gift of the crown. A new church was opened in 1830 in the township of Thornes. The Independents and the Wesleyan Methodists have each two chapels; and the Quakers, Unitarians, Roman Catholics, and Primitive Methodists one each. The grammar-school, founded by Queen Elizabeth in 1592, possesses endowments which produce about 300*l*. a year. The trustees, who are a corporate body, appoint a head master, who has a salary of 160*l*., and a second master who has 80*l*. a year. The children of all resident parishioners are admitted into the school, and receive a free classical education: a separate master is appointed to teach writing and arithmetic, for which he receives a quarterly payment from the parents of the scholars. There are exhibitions from the grammar-school to Clare Hall, Cambridge, and Queen's College, Oxford, one to each; and three, each of 50*l*., to either Oxford or Cambridge. Bentley, Archbishop Potter, and Dr. Radcliffe, the founder of the great library at Oxford, were educated at the school. The school-room is commodious, and the number of boys who receive a classical education is usually from thirty to forty. The Green-Coat Charity, which clothes and educates about 125 children of both sexes, was founded in 1707, and has an income of 600*l*., of which 500*l*. arise from lands bequeathed in 1674. There is also a Lancasterian and two national schools, one for boys and the other for girls. In 1823 a proprietary school was established at Wakefield, with a capital of 15,000*l*. In 1833 there were three infant-schools in the parish, attended by 270 children. In the parish the number of children attending day-schools in 1833 was 2100, and Sunday-schools 1946. A literary and philosophical society was established in 1827, and there is a mechanics' institute. There are almshouses for men and women, which are very liberally endowed. The property belonging to them is vested in the hands of the trustees of the grammar-school, who have the control of charitable funds amounting altogether to about 1000*l*. per annum. There is a dispensary and house of recovery, supported by subscription.

In the middle of the sixteenth century Leland stated that 'al the hole profite of the towne standeth by course draperie.' The manufacture of woollen stuffs, which was once extensively pursued at Wakefield, is now almost entirely removed to Bradford and Halifax, but the woollen cloth manufacture, though not on any large scale, and the spinning of woollen and worsted yarn, are carried on: the dyeing of woollen stuffs is a very important branch of industry. There are also roperies, iron-founderies, breweries, ship-yards, starch-works, and copperas-works. The most marked feature of the industry of the town in the present day has arisen from its situation between a vast population of consumers and an extensive district of production, with both of which it is connected by very complete lines of river and canal navigation. The Calder was rendered navigable to the Ouse in 1699, before which period manufactured goods were conveyed for shipment a distance of 30 miles by land-carriage. [CALDER.] The Aire and Calder navigation is perhaps one of the finest lines of inland navigation in the kingdom, and by it sea-going vessels of one hundred tons burthen reach Wakefield from the Humber. Goods shipped at Wakefield reach the port of Goole, in the river Ouse, in eight hours. The navigable communication between Wakefield and the manufacturing districts of Yorkshire and Lancashire is maintained by the Calder and Hebble navigation, which at a short distance from Wakefield, is divided into two branches, the Huddersfield canal and the Rochdale canal, the latter having a short branch to Halifax. At Ashton-under-Lyne the Huddersfield canal is joined by the Peak Forest canal; and from Manchester the communication with Wakefield, by the Huddersfield and Rochdale canals, is extended to Bolton, Bury, and other towns in Lancashire, and by the Duke of Bridgwater's canal with the Mersey, thus uniting the eastern and western coasts. The Barnsley canal and others which join it connect the towns of Barnsley, Sheffield, and Rotherham with Wakefield. The North Midland railway from Derby to Leeds passes within a mile and a half of the town; the Leeds and Manchester railway passes through the town, and is carried over the Calder by an iron bridge; at Normanton, three miles from Wakefield, it joins the North Midland; and at Methley, a mile and a half farther, the North Midland line is joined by the York and North Midland railway, making a continuous line from London to Darlington, with many important branches. From the agricultural districts Wakefield receives large quantities of corn and wool; and coal from the extensive collieries in the parish, and other commodities are exported to Lincolnshire, Norfolk, and Suffolk, and recently coal has been sent to London. The collieries in the parish gave employment to 300 adult males in 1831. The corn trade of Wakefield employs about three hundred vessels of from fifty to ninety tons each. The corn-market, held on Friday, is second only to that of London, and it frequently happens that for many weeks in succession the quantity sold is greater than at Mark Lane. There are ranges of large corn-warehouses on the banks of the river. Malt, which was formerly brought from other districts, is now made at Wakefield to a very large extent. The wool-fairs are also on a large scale; and every other Wednesday there is a great cattle and sheep fair. There are fairs in July and November for horses, cattle, and pedlery. An inland bonding warehouse would add still more to the importance of Wakefield as an entrepôt.

The population of the parish of Wakefield was 16,597, in 1801; 18,474, in 1811; 22,307, in 1821; 24,538, in 1831; and 28,321, in 1841. In 1831 the population of Alverthorpe was 4859; Horbury, 2400; Stanley, 5047, and Wakefield, 12,232: the population of the latter township was 20,000, in 1841, including the prison, asylum, &c. The town does not possess a municipal corporation. A chief constable is appointed by the inhabitants, who is sworn in by the steward of the lord of the manor at a court leet. Wakefield returns one member to parliament under the Reform Act, which first conferred upon it the privilege. The number of electors in 1839-40 was 809. The parliamentary borough comprises the township of Wakefield and parts of Alverthorpe and Stanley. The chief constable is the returning officer. Wakefield is also the place of election for the members for the West Riding.

(Baines's *Yorkshire Directory*; *Boundary Reports*; *Parliamentary Papers*; *Private Communication*.)

WAKEFIELD, REV. GILBERT, was born 22nd February, 1756, in the parsonage-house of St. Nicolas of Nottingham, and was the third son of the Rev. George Wakefield, then rector of that parish. His paternal ancestors had been for many generations proprietors of a small estate at Stakenhill in Derbyshire, which was dissipated by his grandfather's elder brother; his mother's family, whose name was Russell, had been long settled in the town of Nottingham. His father, who afterwards became vicar of Kingston-upon-Thames, died at Richmond

Surrey, in 1776, in his fifty-sixth year; his mother survived till 1800, when she died at Hackney, aged seventy-nine. His eldest brother Thomas, who succeeded his father as vicar of Kingston, held that living till his death in 1806.

After having been taught to read at home, Gilbert was sent, in May, 1759, to a school kept by an old lady at Nottingham; in his fifth year he was put to a writing-school; from that he went at the age of seven to the Nottingham free grammar-school; which two years after he exchanged for that of Wilford, in the neighbourhood of his native town.

In 1767, on his father's removal to Kingston, or rather to Richmond, where he took up his residence, that chapelry being annexed to the vicarage, he was put to a school kept by his father's curate, under whom he began the study of Greek; from this teacher, whom he describes as miserably incompetent, he was transferred two years after to the charge of the Rev. Richard Woodeson, at Kingston, with whom he remained till that gentleman gave up his school and removed to Chelsea in 1772; when Wakefield, now in his seventeenth year, was sent to Jesus College, Cambridge.

Here he applied himself almost exclusively to classical studies. 'Our college lectures in algebra and logic,' he says in his Memoirs, 'were odious to me beyond description;' adding however, 'As to the elements of geometry and algebra, these are in themselves so extremely plain, so accessible to every capacity, and carry with them such beautiful and engaging evidence—truth in her very essence—that I can scarcely account for an indisposition to such theories but from a defect of judgment or dexterity in the teacher.' In the third year of his residence he wrote for Dr. Brown's three medals; and, although he admits that his Greek Ode and his two epigrams (one Greek, the other Latin) were worthless, he maintains that his Horatian Latin ode, which also failed, deserved a better fate. In 1775 he commenced the study of Hebrew; having accidentally discovered what he calls 'the abominable stupidity—a stupidity which no words can sufficiently stigmatise—of learning that language with the points,' and obtained a Masclef's Grammar, which enabled him, he says, in the course of ten days, by the help only of Buxtorf's 'Lexicon,' to read nine or ten of the first chapters in Genesis, 'without much difficulty and with infinite delight.'

In January, 1776, he took his Bachelor's degree, and in April following he was elected to a fellowship in his college. In the same year appeared his first publication, a small 4to. volume of Latin poems, 'Poemata Latine partim scripta, partim reddita,' which was printed at the University press.

In March, 1778, Wakefield was ordained deacon by Dr. Hinchcliffe, bishop of Peterborough. He had been from his earliest years, as he continued to the end of his life, strongly attached to the study of theology; but his opinions had already begun to take that deviation from the common standard which ultimately carried him out of the pale of the church in which he had been born and educated. 'Even then,' he says, speaking of his entering into holy orders, 'I was so little satisfied with the requisition of subscription, and the subjects of that subscription themselves, that I have since regarded this as the most disingenuous action of my whole life, utterly incapable of palliation or apology; and I hold it out accordingly to the severest reprobation of every honest reader.' About three weeks after his ordination he left the University for the curacy of Stockport in Cheshire, of which the Rev. John Watson was incumbent; but he remained in this situation only for a few months, quitting it before the end of the year for the curacy of St. Peter's at Liverpool,—'principally,' he states, 'with a view of establishing a day-school in that town, if a suitable opportunity should present itself.' In March, 1779, he married Miss Watson, the niece of his late rector. 'While I continued at Liverpool,' he says, 'I persevered in reading the New and Old Testaments with all possible attention and assiduity. My objections to the creed of my forefathers were daily multiplying, and my determination was already made to quit the church for some other line of life on the first opportunity. My attachment however to theology would never suffer me to think with tranquillity of transferring myself to any other profession, independently of additional objections of a very serious nature to such an alteration in my plan of life.'

In August, 1779, on the invitation of the trustees of the Dissenting Academy at Warrington, he removed thither to fill the situation of classical master in that establishment. While here, he published, in 1781, his first theological work, 'A New Translation of the First Epistle of Paul the Apostle to the Thessalonians,' 8vo. This was followed in the same year by 'A Plain and Short Account of the Nature of Baptism,' 12mo.; and an 'Essay on Inspiration,' 8vo. All three publications were brought out at the Warrington press, as was also 'A New Translation of the Gospel of St. Matthew,' 4to., which he produced in the following year. For the first six years after his leaving college, he intimates, the Greek and Roman writers received a very small portion of his attention: but while at Warrington he prosecuted the study of Hebrew, learned Syriac and Chaldee, acquired a perfect knowledge of the Samaritan and Syro-Chaldaic, formed some acquaintance with the Æthiopic, Arabic, and Persian, and read the Coptic version of the New Testament. He remained at Warrington till the Academy was broken up in 1783, after it had existed twenty-six years. On this he retired in the first instance to the village of Bramcoate in Nottinghamshire, with the intention of taking pupils into his house; but he did not succeed in procuring any. While here he published anonymously, at London, a small tract in 12mo., entitled 'Directions for the Student in Theology,' and also the first volume, in 8vo., of his 'Enquiry into the Opinions of the Christian Writers of the Three First Centuries concerning the Person of Jesus Christ,' a work which he never carried farther. In May, 1784, he removed to his brother's parish of Richmond in Surrey, and advertised for pupils there, but was as unsuccessful as at Bramcoate; and at Michaelmas in the same year he took up his residence in his native town of Nottingham. Up to this time he had continued to preach occasionally; a sermon which he preached at Richmond on 29th July, 1784, the thanksgiving-day on account of the peace, was soon after printed; and he also appeared two or three times in the Nottingham pulpits in 1785 and 1786. But from that last date he became not only wholly alienated from the established church, but its open and bitter assailant, although he never joined any body of dissenters. Indeed he came at last to the conclusion that public worship in any form was wrong.

He got some pupils at Nottingham, and remained there for six years. During this period his publications were—an edition of 'The Poems of Mr. Gray, with Notes,' 8vo., Lond., 1786; an edition of Virgil's 'Georgics,' 8vo., 1788, from the Cambridge University press; 'Remarks on Dr. Horsley's Ordination Sermon,' 12mo., Lond., 1788; 'Four Marks of Antichrist,' 8vo. Lond., 1788; 'A New Translation of those parts of the New Testament which are wrongly translated in our Common Version,' 8vo., Lond., 1789; 'An Address to the Inhabitants of Nottingham' (on the Test Laws), 8vo., Lond., 1789; 'Remarks on the Internal Evidence of the Christian Religion,' 8vo., Lond., 1789; 'Silva Critica, sive in Auctores Sacros Profanosque Commentarius Philologus, Pars prima,' 8vo., 1789, from the Cambridge University press; 'An Address to Dr. Horsley, Bishop of St. David's, on the Liturgy of the Church of England,' 8vo., Birmingham, 1790; 'Silva Critica, Pars secunda,' 8vo., Cambridge, 1790; and 'Cursory Reflections on the Corporation and Test Acts,' 8vo., Birmingham, 1790. He always wrote with extraordinary rapidity, and certainly often with very little consideration, and he generally rushed to the press with his manuscript before the ink was dry. He was however a hard student, methodical, punctual, and a great economist of his time. In this way he found leisure for a good deal of society, and also for some rather singular indulgences. 'During my abode at Nottingham,' he relates, 'I never failed to attend all the capital punishments that took place there; courting at all times every circumstance which might read me a wholesome lecture on mortality, or suggest an additional motive of gratitude to God for the comforts of my own condition.'

In July, 1790, however, he was induced to leave this and the other attractions of Nottingham by an invitation to become classical tutor in the dissenting academy at Hackney. But this situation he only held till June, 1791. A quarrel with his colleagues finally induced him to give in his resignation, after some minor causes had contributed to make him dissatisfied with his position.

Towards the end of the year 1781 he published at London one of his most considerable works, his 'Translation of the New Testament, with Notes,' in 3 vols. 8vo. This performance, in which he had the good taste to adhere to the words of the existing translation wherever he thought they conveyed the correct sense, was not unfavourably received, and he produced a second edition of it, in 2 vols., in 1795. Its first publication was immediately followed by 'An Enquiry into the Expediency and Propriety of Public or Social Worship,' 8vo., Lond., 1791, a tract which made some noise, was twice reprinted in this and the next year, and drew forth several answers, to which he replied in two additional expositions of his views published in 1792. In 1792 also appeared a third part of his 'Silva Critica,' printed, like the two former parts, at the Cambridge University press. And in the same year he published, in one vol. 8vo., his 'Memoirs' of his own life, which he is said to have written in twelve days. The work certainly has the appearance of having been rather rapidly composed.

For the next six years his biography is merely the history of the appearance of his successive publications: for, continuing to reside at Hackney, he now sought no other employment except writing for the booksellers. In 1793 he brought out a fourth part of his 'Silva Critica,' at London, at his own expense, the curators refusing him the further use of the Cambridge press. The same year he published, in 8vo., a treatise on the 'Evidences of Christianity,' being an enlarged edition of the tract on the same subject he had published in 1789. He now turned for the first time to politics, or to theologico-political discussion, and in 1794 published three pamphlets: 'The Spirit of Christianity compared with the Spirit of the Times in Great Britain,' which went through three editions; an answer to Paine, under the title of 'An Examination of the Age of Reason,' of which a second edition was called for the same year; and a vehement philippic against the war with France, in the form of 'Remarks on the General Orders of the Duke of York to his Army.' Then, striking into another new path, he produced his first complete edition of an antient classic—a Horace, with notes, and what he called an amended text—in 2 vols. 12mo., Lond., 1794. It is renowned for a proposed conversion of 'O beate Sexti,' in the 4th ode of the 1st book, into 'O bea te, Sexti,' which is set down without a thought being given to the inadmissibility of such a reading on the most obvious metrical grounds. The Horace was followed the same year by a selection of Greek Tragedies, in 2 vols. 8vo., and that by a first volume of an edition of the 'Works of Pope,' 8vo., Warrington, which was not continued. A fifth part of the 'Silva Critica,' 8vo., Lond., a 12mo. volume of 'Poetical Translations from the Antients,' an edition, in a volume of the same size, of the remains of Bion and Moschus, and a 'Reply to the Second Part of Paine's Age of Reason,' 8vo., all appeared in 1795. His publications of the next year were:—an edition of Virgil, with a few notes, in 2 vols. 12mo.; an 8vo. volume of 'Observations on Pope;' 'A Reply to the Letter of Edmund Burke, Esq., to a Noble Lord,' which went through three editions; and a new edition, with notes, of Pope's Translation of the Iliad, in 11 vols. 8vo. This year also appeared the first volume, in 4to., of his Lucretius, of all his editions of antient authors the one that was most wanted and upon which he has bestowed the greatest pains, and the only one that remains in any estimation. The second and third volumes followed in the course of the succeeding year, 1797; which gave birth besides to a Latin pamphlet—'Diatribe Extemporalis,' as he entitled it—on Porson's new edition of the 'Hecuba;' 'A Letter to Jacob Bryant, Esq., concerning his Dissertation on the War of Troy,' 4to.; and 'A Letter to William Wilberforce, Esq., on the subject of his late Publication' (his 'Practical View of Christianity'). The last-mentioned publication reached a second edition.

In January, 1798, Dr. Watson, bishop of Llandaff, came forward in the new character of a champion of the war, in a pamphlet which he entitled 'An Address to the People of Great Britain.' Both the drift of this address, and what seemed to him the apostasy of the writer, kindled Wakefield's very combustible temper; and on the evening of the day on which it came into his hands he finished a very vehement 'Reply to some parts of the Bishop of Llandaff's Address,' which he immediately sent to the press. It was published by Mr. John Cuthell, of Middle Row, Holborn, a dealer in old books, to whom he brought it without any intimation of its nature. Cuthell was thereupon indicted for the publication of a seditious libel; and being tried before Lord Kenyon and a special jury at Westminster, on the 21st of February, 1799, was found guilty, and on the 18th of April following was sentenced to pay a fine of thirty marks. Wakefield repaid Cuthell all the expenses to which he had been put, amounting to 153*l.* 4*s.* 8*d.*, a sum which he afterwards described as equal to the clear annual income of all he was worth. Wakefield himself was also tried at Westminster the same day with Cuthell; and Johnson, a bookseller, who had sold some copies of the pamphlet, a few days after before the same judge at Guildhall: we are not informed what was Johnson's sentence; but Wakefield, who, in the interim between the conviction of Johnson and his being himself brought up for judgment, published 'A Letter to Sir John Scott, his Majesty's attorney-general, on the subject of a late trial in Guildhall' (that of Johnson), was sentenced by Mr. Justice Grose, on the 30th of May, to be imprisoned in Dorchester jail for two years, and to give security for his good behaviour for five years after the expiration of that term, himself in 500*l.*, and two others in 250*l.* each. A subscription was immediately raised for him among the friends of opposition politics, which ultimately amounted to about 5000*l.* He printed and gave away, but did not regularly publish, his 'Defence,' and two subsequent addresses to the court of King's Bench, one actually delivered, the other only intended to have been delivered; and he bore with fortitude and good humour his two years' incarceration, which, with the exception of some impositions in money matters by the jailor, does not appear to have been attended with any unusual hardship. While in prison he printed an imitation, in English verse, of the Tenth Satire of Juvenal, 12mo., 1800; and also the same year a translation, in an 8vo. pamphlet, of 'Some Essays of Dion Chrysostom, with Notes.' In 1801 he published a small 12mo. tract on some discoveries he supposed he had made as to the laws of Greek hexameter verse, under the title of 'Noctes Carcerariae.' His release took place on the 29th of May, 1801; upon which he immediately hurried to London, and commenced a course of lectures on the Second Book of the Æneid, the delivery of which occupied him till the beginning of July. On the 27th of August he was taken ill of what turned out to be typhus fever, which carried him off on the 9th of September. He left, besides his widow, four sons and two daughters.

All Wakefield's publications have been mentioned in the above sketch, except 'An Essay on the Origin of Alphabetical Characters' (endeavouring to prove that they must have been revealed from Heaven), which he communicated, in 1784, to the Literary and Philosophical Society of Manchester, and which is printed in the second volume of their Transactions, and, in an enlarged and amended form, with the second edition of his Memoirs; and many papers which he contributed to various periodical publications, especially the 'Theological Repository' and the 'Monthly Magazine.' He had also made considerable collections for a Greek and English Lexicon, which remained after his death in possession of his family. A new edition of his Memoirs, extended to two volumes, and brought down to the close of his life, was published by his friends, Messrs. John Towill Rutt and Arnold Wainewright, in 1804; and a 'Collection of Letters' that passed between him and Charles Fox, chiefly upon points of classical criticism, has since been published.

His scholarship, in its amount and character, has been ably estimated by Dr. Parr, in a letter printed in the second edition of his Memoirs, vol. ii., pp. 437-453, although his deficiencies may perhaps be thought to be touched by his friend and admirer with a lenient hand. He had evidently read rapidly a great deal of Greek and Latin, and, by the help of a memory which he used to complain of as too good, had retained an unusually large proportion of the miscellaneous intellectual sustenance which he had thus taken in; but, partly from imperfections in the manner in which he had been educated, partly from defects of mental character, he was not and never could have become either a profound or a refined scholar. Both his Latin style and his English are vicious and barbarous in the extreme. Of his moral nature a very able dissection is quoted, apparently from the 'British Critic,' in the article about him in Chalmers's 'Biographical Dictionary.' Honest and high-minded he certainly was, as well as warm-hearted; but his ardour became intemperance and ferocity whenever it encountered opposition, and his honesty only made him the more intolerant of difference of opinion upon any subject in another, a thing for which he had no name except only knavery or imbecility. No man ever adhered to the most maturely considered conclusions with more pertinacity than he did to judgments which he would form in the most precipitate manner.

WAKES, holiday festivals which are kept once a year in some of the rural districts of England. They are the remains of certain religious wakes, wakings, or vigils, followed by a festival, which were once held in all the country parishes. Previous to the Reformation in England, every church, when it was consecrated, was dedicated to some particular saint or martyr, and every rural parish had its wake every year, and most of them had two wakes, one on the day of dedication, the 'dies dedicationis,' and another on the birth-day of the saint, the 'propria festivitas sancti.' These church festivals seem to have been established by the early popes and bishops soon after the introduction of Christianity into England, in the place of the heathen festivals to which the people had been accustomed. Bede (*Eccl. Hist.*, lib. i., cap. 30) states that Pope Gregory, in his letter to Melitus, a British abbot, says, 'Whereas the people were accustomed to sacrifice many oxen in honour of dæmons, let them celebrate a religious and solemn festival, and not slay the animals diabolo, to the devil, but to be eaten by themselves ad laudem Dei, to the praise of God;' and in the same letter the people were directed to make booths and tents with the boughs of trees adjoining to the churches, 'circa easdem ecclesias.'

In the Saxon times the church method of reckoning the day was from sunset to sunset, so that the Sunday and festival and fast days began about six o'clock on the evening preceding the day itself, and the eve was in fact the commencement of the sacred day, when the people were accustomed to repair to the church and to join in the religious exercises. These night devotions were called in Anglo-Saxon wæccan, wakes, and the night itself was called the eve (the Anglo-Saxon æfyn or æven), which explains why Christmas-eve and other eves of sacred days precede the day itself. On these occasions the floor of the church was strewed with rushes and sweet-smelling herbs [RUSH-BEARING], the altar and pulpit were adorned with green boughs and flowers, and tents were erected in the churchyard, which were supplied with provisions and ale. The eve was dedicated to devotion; the following day to festivity. These festivals gradually deviated in most parishes from the original purposes for which they were instituted. The inhabitants of neighbouring parishes attended each other's festivals, and others came from a distance, especially if the saint was of high reputation; hawkers and pedlars frequented them with their wares, and the religious wakes were converted into fairs and scenes of dissolute indulgence. The wakes continued to be kept in this way till 1536, when Henry VIII., by an act of convocation, ordered the festival of the saint's day to be abolished, and that of the dedication of the church to be kept on the first Sunday in October in all the parishes. But the saint's day was the favourite festival of the people; they gradually ceased to attend the festival of the dedication, and it has long been entirely discontinued, while the saint's day festival still subsists in the altered form of a country wake.

(Strutt's *Sports and Pastimes*, by Hone; Brand's *Popular Antiquities*, by Ellis.)

WALAFRI'DUS, or **WALHAFRE'DUS**, surnamed 'Strabo' or 'Strabus,' because his eyes were awry, was a German monk who lived in the first part of the ninth century. Some writers have thought that he was an Anglo-Saxon, and a brother of Bede, but Fabricius proves by the monk's own words that he was a native of Suabia in Germany, an opinion which now seems to be general. He received his education in the monastery of St. Gallen, which was then one of the most famous schools in Germany, and he finished his studies in the monastery of Fulda, under the celebrated Rabanus Maurus. After having taken orders, he became dean of St. Gallen, and in 842 he was chosen abbot of Reichenau (Augia Dives) in the diocese of Constance. It is said that for some time he was head master of the school in the monastery of Hirsfeld. He died in 849, in France, where he was travelling on some business. Walafridus was a learned man for his time; he is the author of several works on divinity, ecclesiastical history, and botany; the most remarkable are:—'De Officiis Divinis, sive de Exordiis et Incrementis Rerum Ecclesiasticarum,' which is contained in the 'Bibliotheca Patrum Maxima,' and in several other collections of early writers on divinity; 'Vita B. Galli Confessoris,' in Goldast's 'Scriptores Rerum Alemannicarum;' 'Vita S. Othmari Abbatis,' in Goldast's 'Vita S. Blaitmaici Abbatis, Hiiensis, et Martyris,' in 'Acta Sanctorum,' 'Bibliotheca Patrum Maxima,' and in several other collections; 'Hortulus'—this little work on botany, which was much esteemed, is written in Latin verse; it was published at Nürnberg, 1512, 4to.; Freiburg im Breisgau, 1530, 8vo.; Frankfort-on-the-Main, 1564, 1571, 8vo.; Venice, 1547; Basel, 1627; it is likewise contained in several collections, as in the 'Bibliotheca Patrum Maxima,' in the 'Bibliotheca Patrum Coloniensis,' &c.; 'Glossae Latino-Barbaricae de Partibus Humani Corporis rursum ex Doctrina Rabani Mauri per Walafridum descriptae,' in Goldast cited above. 'Glossae ordinariae interlineares in Scripturam Sacram:' it has been supposed that Rabanus Maurus is the author of it, and that Walafridus only put it together. Editions of it are contained in the different 'Bibliothecae Patrum,' as well as in some other collections cited above. The first edition is a large finely-printed folio, without date or place, and supposed to have been printed at Venice about 1480. (*Catalogue of the Library of the Duke of Sussex*, vol. i. pt. 2.) Some French writers attribute to Walafridus the beginning of the celebrated 'Annales Fuldenses.' A complete catalogue of the works and other literary productions of Walafridus is contained in Fabricius, *Bibliotheca Latina Mediae et Infimae Aetatis;* Jöcher, *Allgemeines Gelehrten-Lexicon*, sub voc. 'Strabo (Walafridus);' *Biographie Universelle.*

WALAN, the name of a tree in Amboyna, which was first described and figured by Rumphius, in his 'Herbarium Amboinense,' and called by him *Ichthyoctonos montana*. It is a large tree, and much valued by the natives of the island in which it grows. It is very rare, and the description of Rumphius is too imperfect to allow at present of its being assigned to any particular division of the vegetable kingdom. It has a straight trunk, very high, covered with a thick fragile bark, of a pale reddish colour above, but a darker red at the lower part; the wood is white, but brown in the centre of old trunks, and is very solid and compact; the roots are large and of a bright red colour, the same as the base of the trunk; the branches are thick, cylindrical, alternate, knotty, tuberculated, and furnished with petiolated leaves, which are alternate, seated close together, and are thick, oval, pointed, eight or ten inches long, and three or four wide. The flowers do not appear to have been seen by Rumphius, although he has represented them in his figure as solitary and axillary, and consisting simply of four sepals. The fruit is a pome and as large as an orange, and having the same form, but somewhat more elongated. At the base it is surrounded by a permanent calyx with 5 lobes; from this circumstance it is probable that the flowers in the figure are altogether hypothetical. The fruit is at first yellow, but on drying becomes red and finally black. Its interior is filled with a dry and fungous pulp of a pale yellow colour and an insipid taste, which envelops four or five seeds or nuts, which are attached to the summit of the fruit by an equal number of long cords. Each seed is two inches long and one broad, compressed, roughish, and of a fine brown colour.

The inhabitants of the isle of Amboyna use the bark of the roots of the Walan for catching fish. Before it is used for this purpose it is powdered, and this process by the natives is always attended with a peculiar ceremony. The bark of the root is the part of the tree employed, and when it is collected for fishing, a large party attends. It is powdered by a single individual with a large stone, and whilst this process is going on, the rest lie round the stone in a circle; when all is over, a signal is given by one of them crowing like a cock; they then arise and collect the powder into little baskets which is reserved for use. In catching the fish other ceremonies are employed. The party goes in the morning early, and after throwing the powder upon the water and mixing it till it foams, they cast a net over the river, and then retire from the river maintaining a death-like silence till the poison has acted on the fish. In the course of an hour the net is generally found full of half-dead fish. 'The fish will recover from the effect of the poison if thrown into fresh water, and are quite wholesome as food, although they will not keep so long as fish caught by other means. Rumphius procured some of the bark, and, omitting the ceremonies, found it a very successful mode of fishing. The bark of this tree does not seem to be an active poison; the powder affects the eyes very much, and produces inflammation. The use of the powder amongst the natives is confined to particular families, and there is a belief that any others who should use it would be afflicted with various diseases. This will account perhaps for the ceremony with which it is used. Persons who bathe in water impregnated with the powder of the tree experience a tingling sensation of the skin.

(Rumphius, *Herbarium Amboinense*, vol. iii., p. 214.)

WALCH, JOHANN GEORG, a distinguished German divine, was born at Meiningen, in 1693. His father was general superintendent of the Protestant church in the duchy of Saxe-Weimar. In 1710 he went to the university of Jena, where he studied divinity and philology, and of which he became afterwards one of the first ornaments. In 1724 he was appointed extraordinary professor of divinity in the university of Jena; and in 1726 he took his degree of D.D., and was appointed ordinary professor of divinity, an office which he held till his death in 1775.

Walch distinguished himself as a scholar at a very early age. In 1712, when he was only nineteen, he published a good edition of Velleius Paterculus, which he accompanied with an index and valuable notes; in 1714 he published 'Diatriba de Vita et Stilo C. Cornelii Taciti,' a work characterized by sound judgment, though the production of a youth of twenty-one. His works are numerous, the principal are:—1, 'Philosophisches Lexicon, darin die in allen Theilen der Philosophie fürkommenden Materien und Kunstwörter erklärt werden,' Leipzig, 8vo., 1726. This work ran through four editions, and was a standard book till new philosophical terms came in use, together with the establishment of the school of Kant, which in its turn was superseded by the systems of Fichte, Hegel, and Schelling. 2, 'Historia Critica Latinæ Linguæ,' Leipzig, 8vo., 1716; ran through four editions. 3, 'Historische und Theologische Einleitung in die vornehmsten Religions-Streitigkeiten,' 5 vols. 8vo., Jena, 1724-36. 4, 'Historische und Theologische Einleitung in die vornehmsten Religions-Streitigkeiten der Evangelischen Kirche, 5 vols. 8vo., Jena, 1730-39. 5, 'Bibliotheca Patristica literariis Adnotationibus instructa,' 8vo., Jena, 1720; 2nd edition, Jena, 1834, by Professor Danz. 6, 'Bibliotheca Theologica selecta, literariis Adnotationibus instructa,' 4 vols. 8vo., Jena, 1757-65. 7, Dr. Martin Luther's 'Sämmtliche Schriften,' 24 vols. 4to., Halle, 1740-50. A carefully revised edition of the works of Luther; the 14th volume contains Luther's Latin version of the Bible, which was separately published by Walch in 1745. Walch also published an edition of Lactantius, Leipzig, 1715; 2nd edition, 1735. His principal works are in the library of the British Museum. Walch was the father of three sons, Johann Ernst Immanuel, Christian Wilhelm Franz, and Karl Friedrich, each of whom attained a high rank in the learned literature of Germany.

(Brucker, *Bilder-sal heutiges Tages lebender und durch Gelehrtheit berühmter Schriftsteller* (with portraits by Haid), the fifth biography in the fourth 'Zehnt.' This splendid work is divided into ten zehnts, or 'tenths,' and without pages. Comp. Gossen, *Das Gelehrte Europa*.)

WALCH, CHRISTIAN WILHELM FRANZ, one of the greatest divines of Germany, was the second son of Johann Georg Walch, and the brother of Johann Ernst Immanuel Walch. He was born at Jena in 1726, and after having studied divinity in that university, travelled with his brother Immanuel in France and Italy. The learned Italian Gori invited him and his brother to contribute to his 'Symbola Literaria,' and Gori wrote several memoirs for the 'Transactions' of the Societas Latina at Jena. In 1750 Walch was appointed extraordinary professor of philosophy in the university of Jena; in 1753 he was chosen president of the Societas Latina in this town; in 1754 he went to Göttingen as extraordinary professor of divinity; he became ordinary professor of divinity in 1757. He died suddenly in 1784, whilst talking with his wife and children.

Walch wrote many works on classical literature, divinity, and ecclesiastical history, many of which are among the best of their kind, and they all bear the marks of a superior mind and extensive learning. A complete catalogue of his works is given in the authority cited below; and the greater part of them are in the library of the British Museum. The following are the principal works:—1, 'Antiquitates Pallii Philosophici veterum Christianorum,' Jena, 1746. The first section of this book treats of the pallium of the antient philosophers; and the second of the pallium assumed by Christian philosophers. 2, 'Oratio de Eloquentia Latina veterum Germanorum,' 1750; an interesting little book, in which the author shows that a considerable number of antient Germans, among whom was Arminius, the conqueror of Varus, were well acquainted with the Roman language and literature: there are no hypotheses or opinions in this book; it is founded on facts stated by Roman authors. 3, 'Historia Patriarcharum Judaeorum quorum in Libris Juris Romani fit Mentio,' 1751. The object of this work is to show that even during the later period of the Roman empire the Jews continued to live under the moral inspection of 'patriarchs,' a Greek word translated from the Hebrew, and which, according to Walch, was first used by the 'Seventy' of *Alexandria*; the Roman laws referred to by the author are the tituli, '*De* Judaeis,' 'Coelicolis,' and 'Samaritanis' in the Codes of Theodosius and Justinian. 4, 'Compendium Historiae Ecclesiasticae recentissimae,' Göttingen, 1757. 5, 'Entwurf einer vollständigen Historie der Kirchen-Versammlungen,' Leipzig, 1759. 6, 'Monimenta Medii Aevi ex Bibliotheca Regia Hanoverana,' 2 vols. 8vo., Göttingen, 1758. 7, 'Grundsätze der Kirchengeschichte des Neuen Testaments,' 4 vols. 8vo., 2nd edition, Göttingen, 1772-74. 8, 'Grundsätze der Natürlichen Gottesgelehrsamkeit,' 2nd edition, Göttingen, 1775. 9, 'Kritische Untersuchung vom Gebrauch der Heiligen Schrift unter den alten Christen in den ersten vier Jahrhunderten,' Leipzig, 1779. 10, 'Neueste Religions Geschichte,' 9 vols. 8vo., Lemgo, 1771-83. 11, 'Bibliotheca Symbolica vetus ex Monimentis Quinque priorum Saeculorum maxime collecta,' &c., Lemgo, 1770. 12, 'Bibliotheca Philologica,' 3 vols. 8vo., Göttingen, 1770-77. 13, 'Entwurf einer vollständigen Historie der Ketzereien, Spaltungen und Religions-Streitigkeiten, bis auf die Zeiten der Reformation,' 11 vols. 8vo., Leipzig, 1762-85. This work made great sensation throughout all Europe, and the Germans call its author generally, Der Ketzer-Walch (Ketzer signifies a heretic), in order to distinguish him from his brothers, his father, and so many other writers whose name is Walch. Walch is also the author of an excellent biography of Catherine von Bora, the wife of Luther, which is preceded by her portrait engraved after the original painting of Lucas Cranach. The younger brother of Walch, Karl Friedrich, born in 1734, was professor of law at Göttingen, and afterwards at Jena, where he died in 1799. He is the author of several distinguished works on jurisprudence, such as, 'Glossarium Germanicum Interpretationi Constitutionis Criminalis Carolinae interserviens,' Jena, 1790. The 'Constitutio Criminalis Carolina,' or the Criminal Code issued by the emperor Charles V., is still in use in some parts of Germany, as the duchy of Brunswick and the kingdom of Hanover.

(Strodtmann, *Das Neue Gelehrte Europa*, part 14, in vol. iv., p. 455, &c.; *Catalogues* of the Library of the British Museum.)

WALCH, JOHANN ERNST IMMANUEL, was born at Jena on the 29th of August, 1725. His father was Johann Georg Walch, a divine, and his mother was a daughter of the learned Budæus (Budé). He studied divinity at Jena, and in 1747 undertook a long journey with his brother Christian Wilhelm Franz, to France, Italy, and several other countries. Though the two brothers were rather young, the name of their father procured them everywhere a favourable reception. They thus were on intimate terms with Assemani, the cardinals Maffei and Passionei, as well as with several other celebrated men at Rome. It is said that they were presented to pope Benedict XIV., who asked them if they were the sons of the celebrated heretic J. G. Walch. In 1759 J. E. I. Walch was appointed professor of divinity at Jena, his name being already known by several works on ecclesiastical history. Next to divinity, natural history was his favourite science, which he cultivated with great success, as may be seen from his works on natural history, cited below. He was a member of many learned societies in Italy, Germany, and other countries. He died on the 1st of December, 1778. His principal works are—1, 'De Christianorum sub Diocletiano in Hispania Persecutione,' 8vo., Jena, 1751; 2, 'Marmor Hispaniae antiquum Vexationis Christianorum Neronianae insigne Documentum illustratum,' 4to., Jena, 1750; 2nd edition, under the title 'Persequutionis Christianae Neronianae in Hispania ex antiquo Monumento probandae uberior Explanatio,' 4to., Jena, 1753; 3, 'Acta Societatis Latinae Jenensis, edita,' 4 vols. 8vo., Jena, 1752-55. The Transactions of this Society, which were under the care of Walch for several years, contain many of his minor productions; 4, 'Dissertationes in Acta Apostolorum,' 3 vols. 4to., Jena, 1756-61; 5, 'De Arte critica veterum Romanorum Literaria,' 3rd edition, Jena, 1771; 6, 'Das Steinreich systematisch entworfen' (a system of mineralogy), 2 vols. 8vo., 2nd edition, Halle, 1769; 7, 'Antiquitates Medicae selectae,' 8vo., Jena, 1772; 8, 'Sigillum Medici Ocularii Romani nuper in Agro Jenensi repertum et Observationibus illustratum,' 4to., Jena, 1763; 9, 'Georg Wolfgang Knorr's Sammlung von Merkwürdigkeiten der Natur und den Alterthümern des Erdbodens welcher petrificirte Cörper enthält, herausgegeben mit Classifications-Tabellen, &c., von J. E. I. Walch, mit illuminirten Kupfertafeln, etc.,' 7 parts, in 3 vols. fol., Nürnberg, 1768-73. This collection of Knorr's was celebrated all over Europe. Statius Müller had published a catalogue of it, with a description of the different objects, but this work was incomplete and without any systematical order. The work of Walch however is still considered a model for similar works: a French translation of it was published in 1775, and a Dutch in 1779. The principal works of Walch are in the library of the British Museum.

(*Lebensgeschichte des wohlseligen Herrn Hofraths Johann Ernst Immanuel Walch*, Jena, 1780, 8vo., contains a complete catalogue of his works and minor productions.)

WALCHEREN. [ZEALAND.]

WALCK-VOGEL, or WALGH-VOGEL. [DODO; STRUTHIONIDÆ.]

WALDECK, a principality in the north of Germany, consists of two parts: 1, the principality or county of Waldeck, properly so called, which is situated between 51° 4′ and 51° 31′ N. lat., and between 8° 31′ and 9° 12′ E. long.; it is bounded on the west and north by the Prussian province of Westphalia, on the east and south by Hesse-Darmstadt; 2, the county of Pyrmont, which is situated on the left bank of the Weser, between the territories of Lippe, Hanover, and Prussia. The area of the whole is 450 square miles, and it is divided into four bailiwicks, three of which belong to Waldeck, the former county of Pyrmont being the fourth. The county of Waldeck has an area of 424 square miles. It is a mountainous country, consisting of chains or of detached masses, without any wide valleys; it is perhaps the most elevated region of western Germany. There is not one large river, but there are several small streams. The climate is colder than that of Hesse under the same latitude; but the air is pure and healthy. The soil is in general stony and sterile, and not well suited to tillage, yet the indefatigable industry of the inhabitants raises all kinds of corn and flax sufficient for their own consumption, and in very good years a supply for exportation. Potatoes are grown in abundance, and in unfavourable seasons are the chief subsistence of the poorer classes. There is a great quantity of timber, but there is no opportunity for exporting it. In some parts of the country there are good pastures, in which numerous herds of horned cattle are fed and fattened for exportation, and considerable quantities of butter and cheese are made. Sheep and swine are kept in great numbers. The minerals are copper, iron, lead, alabaster, marble, slate, very fine freestone, and salt. There are no manufactures; the inhabitants make some coarse woollen cloths, plush stockings, and sufficient linen for their own use, but none for exportation. In Pyrmont there are five villages, the inhabitants of which derive their principal subsistence from the manufacture of thread stockings, which they export in large quantities. The exports of the principality are the natural productions of the country. The population amounts to 57,000 souls. The prince and the great majority of the subjects are Lutherans; there are about 800 Roman Catholics, 600 Calvinists, 500 Jews, and a few Quakers. The revenue of the prince is about 45,000*l.* sterling, and the public debt 180,000*l.* The prince is a member of the German Confederation, and has in the Diet, with Hohenzollern, Lippe, Reuss, and Liechtenstein, a collective vote (the 16th), and in the general assembly a separate vote. His contingent is 518 men, forming part of the first corps. [PYRMONT.]

(Brockhaus, *Conversations-Lexicon*; W. v. Schlieben, *Die Deutschen Bundesstaaten*; Hassel; Cannabich.)

WALDECK, PRINCES OF. The house of Waldeck is one of the oldest dynasties of northern Germany. It is of Saxon origin, and is descended from one of those powerful dukes of antient Saxony who commanded in the wars against Charlemagne, perhaps from Wittekind, although this cannot be historically established. They were formerly counts, but the title of prince was conferred upon Count George Frederic in 1682. This prince, born in 1620, was a celebrated general of the emperor Leopold I., and obtained several signal victories over the Turks and the French. Delille, the French poet, has addressed to him his ode 'De la Pitié,' praising him for his humane conduct towards the French. The republic of the United Provinces of the Netherlands appointed him commander-in-chief of the Dutch armies. He died in 1692. His brother, Count Josias, had equal military reputation. The republic of Venice put him at the head of her armies, and after his death, in 1711, had a splendid monument erected to his memory in the church of Wildungen, in the principality of Waldeck. Josias was the founder of a younger branch of the house of Waldeck, upon which however the title of prince has not been conferred. Prince Christian Augustus, born in 1744, signalized himself as an able general in the wars against the French during the Revolution. He commanded a part of the Imperial armies. In 1793 he directed the passage of the Imperial troops over the Rhine near Selz, for the purpose of attacking the rear of the famous lines of Weissenburg, defended by the French: they were assailed in front by Field-Marshal Wurmser, the Austrian commander-in-chief, and Field-Marshal Kalckreuth, the Prussia generalissimo. This combined attack, which resulted in the taking of the lines, and was followed by a general rout of the French, is considered one of the most brilliant manœuvres executed in modern times. It is said that the prince of Waldeck, who had the most difficult share in this undertaking, also conceived the idea of the whole plan. He also took the fortress of Kehl, opposite Strasburg, and afterwards commanded in Flanders, displaying such superior talents, that the emperor of Germany appointed him member of the military council at Vienna, and commander-in-chief of the militia of Bohemia. In 1797 the prince-regent of Portugal addressed himself to the emperor for the purpose of obtaining his permission to put the prince of Waldeck at the head of his armies, which were in a very disorganized state. The permission having been granted, the prince went to Lisbon, but died in 1798, before he had carried into effect his plans for reorganizing the Portuguese troops. His grandson, Henry Frederic George, the present reigning prince, was born in 1789, and succeeded his father, prince George, in 1813.

(*Almanach de Gotha*; *Conversations-Lexicon*; *Biographie Universelle*.)

WALDEGRAVE, JAMES WALDEGRAVE, SECOND EARL, was the son of James, first earl Waldegrave, K.G., who was descended from ancestors originally settled at Walgrave in Northamptonshire, and in later times distinguished for their attachment to the Roman Catholic faith. The first Earl Waldegrave derived his oldest title of Baron Waldegrave of Chewton, in the county of Somerset, from his father Henry, who, having married Henrietta, natural daughter of James II., by Arabella Churchill, sister of the Duke of Marlborough, was raised to the peerage in 1683, and, following his father-in-law to Paris on the Revolution, died there in 1689. The Earl had conformed to the established church in 1722, and served under Sir Robert Walpole, who placed great confidence in him, as ambassador, first at Paris and afterwards at Vienna, from 1725 to 1740. He was created Viscount Chewton and Earl Waldegrave in 1729, and died in 1741, at the age of fifty-seven, six months after he had obtained leave to return to England for the recovery of his health. He had married, in 1714, Mary, daughter of Sir John Webbe of Hatherop, in the county of Gloucester, Baronet.

James, who was his eldest son, was born 14th March,

1715. Attaching himself to the court, and becoming a favourite of George II., he was in 1743 appointed a lord of the bedchamber; and in April, 1751, among the changes which took place on the death of Frederick, prince of Wales, he was made steward and warden (or master) of the Stannaries, 'in room,' says Horace Walpole, of 'T—— P——, a bad man; never was ill-nature so dull as his, never dullness so vain: Lord Waldegrave, on the contrary, had complaisance enough to have covered folly or ill-nature, though in him it only concealed a very good understanding, and made his good-nature the less observed.' (*Memoires of George II.*, i. 79.)

About a year and a half after this, in December, 1752, Lord Waldegrave, at the earnest request of the king, was prevailed upon to accept the office of governor to the young Prince of Wales, which Lord Harcourt had resigned. 'The Earl,' says Walpole, 'was very averse to it: he was a man of pleasure, understood the court, was firm in the king's favour, easy in his circumstances, and at once undesirous of rising and afraid to fall.' He adds however, 'A man of stricter honour, or of more reasonable sense, could not have been selected for the employment.' (*Memoires*, i. 255.)

In 1756 Lord Waldegrave obtained a grant of the reversion of one of the tellerships of the exchequer, and in less than two months after he came into possession of this lucrative appointment by the death of Horace, lord Walpole. In 1759 he married Maria, the second of the three natural daughters of Sir Edward Walpole, K.B. (second son of Sir Robert), by Maria Clements, a milliner's apprentice, whose father was postmaster at Darlington. This lady, equally distinguished by her beauty and her virtues, was twenty years younger than the earl; and in 1766, after his death, remarried William Henry, duke of Gloucester, brother of George III., whom she also survived, dying in 1807, at the age of seventy-two. She was the mother of the late Duke of Gloucester, and of the Princess Sophia Matilda of Gloucester.

The most important political transaction in which Earl Waldegrave was engaged, was the attempt into which he was forced by the king, in June, 1757, to form a ministry, with himself at its head. He was actually appointed first lord of the treasury. 'The public,' says Walpole, 'was not more astonished at that designation than the earl himself. Though no man knew the secrets of government better, no man knew the manœuvre of business less. He was no speaker in parliament, had no interest there, and, though universally beloved and respected where known, was by no means familiarized to the eyes of the nation. He declined as long as modesty became him; engaged with spirit the moment he felt the abandoned state in which his master and benefactor stood.' Of the negotiations connected with this project, which was abandoned after a few days, a sketch is given by Walpole (*Memoires*, ii. 220-223), but the most ample details have been preserved by the earl himself.

Proposals were also made to him to take office in the last days of Lord Bute's administration, in the end of March, 1763. The day after he had finally declined these overtures, on the 1st of April, he was attacked by small-pox, and his death followed on the 28th of that month. Leaving only three daughters, he was succeeded in the earldom by his brother John.

An account of the political and court transactions of a portion of his own time by Earl Waldegrave was published under the title of 'Memoirs from 1754 to 1758,' in a quarto volume, in 1821. This work, which had evidently been prepared with the intention that it should be given to the public, is a very clear, full, and perfectly trustworthy narrative, and throws much light upon the restless and complicated intrigues of the latter part of the reign of George II. It leaves a very favourable impression of the writer, of his clear-headedness, as well as of his sincerity and frankness, although it has nothing of the manner of an anxious or systematic defence of his conduct.

WALDEMAR I., King of Denmark, reigned from A.D. 1157 till 1181. He was the son of Knud, or Canut, duke of Sleswig, and king of the Obotrites in Mecklenburg, a prince of the first royal dynasty of Denmark. He was born on the 15th of January, 1131, eight days after the murder of his father, who perished during the civil troubles which then desolated Denmark. To save her son from a similar fate, his mother, Ingeborg, a Russian princess, fled with him to her native country, where the young prince lived during the earlier part of his youth. He afterwards returned to Denmark, and on the death of king Erik IV., Emund, in 1139, Waldemar was chosen king, but on account of his youth he was put under the guardianship of Erik, surnamed Lam, the son-in-law of the late king Erik III., Eiegod. Erik Lam, disregarding the rights of his ward, usurped the royal authority and reigned as Erik V., till 1147, when he resigned and retired to a convent. The guardianship of young Waldemar was now disputed between Svend Eriksen and Knud Magnusen, both royal princes, and the contest having been terminated by a decision of the emperor Frederic I., *Barbarossa*, which was favourable to Svend, that prince assumed the title of king, and in 1156 murdered Knud, who had likewise styled himself king, and reigned in a part of Denmark as Knud or Canut V. Svend also intended to murder Waldemar, who however escaped and made war on Svend, commonly called Sueno IV., whom he defeated in the battle of Viborg, when the usurper was slain by some plundering peasants. This battle was fought on the 22nd of September, 1157, and from this day dates the reign of Waldemar, whose rights to the crown were no longer disputed.

During the first years of his reign Waldemar was occupied with restoring domestic peace to his kingdom. In 1168 he made an alliance with Henry the Lion, duke of Saxony, for the purpose of subjugating the Obotrites and other Wendish or Slavonian nations in the north-eastern part of Germany, over which the kings of Denmark and the emperors of Germany had hitherto exercised a nominal authority. The Danish army and navy were commanded by Absalon, the warlike archbishop of Roeskild, who took Arcona, the capital of the Wendish empire, in the island of Rügen, and broke the idols of Swantewit and other gods of the heathen Wendes. In 1170 he took Julin, the Constantinople of the north (Krantz, *Wandalia*, lib. iii.), and the northern limit of an overland trade with Asia Minor, Persia, and India, the direction of which we may now trace, since the discovery of numerous Arabic coins, along the banks of the Dniepr and the Volga. (Rasmussen, *De Orientis Commercio cum Russia et Scandinavia Medio Aevo*; a rare book, extracts from which are given in *Journal Asiatique*, vol. v. (1824), p. 340, &c.)

After these defeats the Wendes of Rügen, Mecklenburg, and the most western part of Pomerania recognised the Danish king as their sovereign, and Waldemar did homage for his conquests to the emperor Frederic I., whom he met at Lons-le-Saulnier, in the present Franche-Comté. It has been said that he also did homage for his kingdom of Denmark, and this opinion, which has roused the national pride of so many Danish historians, is not without foundation. The title of King of the Wendes, which is still retained among the other titles of the kings of Denmark, dates from the conquests of bishop Absalon. Waldemar also acquired the most southern part of Norway, which he took from king Erling. The latter years of his reign were troubled by a rebellion of Eskild, bishop of Lund, in Scania, which province belonged to Denmark at that time. Waldemar died on the 12th of May, 1181 (some say 1182), at Wordingborg, and it was said that he was poisoned. Waldemar I. was not a warrior only, he is equally distinguished as a legislator; he ordered the laws of several of his provinces to be collected, and he added his own, which are still preserved in the great collections of the Danish law. The Danes call him 'the Great;' but, without prejudice to his merits, this title is more than he deserves. Waldemar's successor was his eldest son Knud or Canut VI., whom he had by Sophia, princess of Pomerania.

(Holberg, Baron af, *Dannemark's Riges Historie*, vol. i., p. 208-247; Krantz, *Saxonia*; *Wandalia*; Mallet, *Histoire du Danemark*.)

WALDEMAR II., surnamed Seier, or 'the Victorious,' king of Denmark, who reigned from 1202 till 1241, was the second son of Waldemar I. His brother, King Knud, or Canut VI., conferred upon him the duchy of Sleswig, and was assisted by him in the consolidation of the Danish government in the Baltic provinces, which had been conquered by Waldemar I. [WALDEMAR I.], and in those of which some parts were conquered during the reign of Knud VI., namely, Esthland, Kurland, and Livonia. During the rebellion of Waldemar, bishop of Sleswig, who likewise belonged to the royal house of Denmark, and who was assisted by Adolphus III., count of Holstein, he took the field for his brother, and they succeeded in conquering Holstein, and in driving out the rebellious prelate, who fled to Germany (1200). After the death of Knud in 1203, Waldemar ascended the throne, and his subjects, as well as his neighbours, soon found that Denmark was ruled by a great king. He finally established the Danish authority in the Wendish provinces, the population of which, a headstrong but not uncivilized race, was still ready for rebellion. The Danish possessions in Esthland, Kurland, and Livonia having been menaced by the natives, Waldemar availed himself of the occasion to carry a plan into execution which, if not his own idea, was at least realized by him. This was to found a Baltic empire, consisting of Denmark, the key and centre of the whole, Holstein, Mecklenburg, all Pomerania, Kurland, Livonia, Esthland, the large islands in the middle part of the Baltic, and the southern parts of Sweden and Norway. The same plan was afterwards conceived and partly realized by the great Gustavus Adolphus of Sweden, and similar empires were founded by the Carthaginians in the Mediterranean, by Mithridates round the Pontus, and on a smaller scale by Venice round the Adriatic Sea and the Archipelago. If this Danish empire was of short duration, it was the result of two causes which have been and always will be equally dangerous to such empires. The immense extent of narrow tracts along the sea-shore afford innumerable points of attack to the continental nations who are excluded from the coast by those tracts, and they can only be defended by a great navy, the chief condition of which is an extensive commerce. Now Denmark being the centre and key of that empire, only the military condition of its existence was fulfilled, while the commercial condition existed only temporally. The Sound was not then, as it is now, frequented by ships of all nations, for the commerce in the Baltic had a more southerly direction from Russia towards the coasts of Pomerania and Holstein, whence the merchandize was carried overland to Germany and France. However, for a short period Waldemar, being in possession of Wisby, Julin (or at least the mouth of the Oder, for the town is said to have been entirely (?) destroyed by Bishop Absalon), and also of Lübeck, was enabled, by the advantages which he derived from the commerce of those towns, to raise that formidable force, the greater part of which he employed in the conquest of Livonia and the adjoining provinces. His army consisted of 160,000 men, and he had a navy of 1200 ships. He sailed for Livonia in 1219. The main body of the army, consisting of Danes, and commanded by Andreas, bishop of Lund, was surprised by the natives and in danger of being cut to pieces, when it was relieved by the king's Wendish and German auxiliaries, who won the day. Tradition says that in the midst of danger a flag fell from heaven, at the sight of which the Danes recovered their courage. This was the 'Danebrog,' in memory of which the Order of the Danebrog was founded. The campaign resulted in the conquest of Esthland, Livonia, and Kurland, and a Danish bishop took up his residence at Riga. During the contest of Frederic II. and Otho of Brunswick for the imperial crown, Waldemar assisted Frederic, who in his turn acknowledged him as king of the Slavonians or Wends, a title which had already been assumed by Waldemar I. Waldemar was now the ruler of the North, but his greatness was humbled by the treachery of a petty German count. Henry, count of Schwerin, had some reason to complain of the king, and not having obtained satisfaction, he treacherously seized him in the island of Laaland, brought him on board a vessel ready for that purpose, and carried him to Schwerin. The numerous enemies of the king protected the count, and even Frederic II. acted in a way which clearly showed that he was pleased with the fate of his rival in the North. Pope Honorius III. alone took the part of the captive king, whose assistance he wished to have in his contest with the emperor; and by his mediation Waldemar was released in 1225, on condition of paying 45,000 marks of silver, an enormous sum for the time, ceding Holstein to its legal possessor Count Adolphus IV., and renouncing the sovereignty of Mecklenburg, which from that time was governed by the descendants of its antient Slavonic kings, the progenitors of the present house of Mecklenburg, who did homage to the emperor. No sooner was Waldemar restored to liberty, than he forgot his promises, and aimed at recovering those provinces which he had ceded, and which had been occupied by his enemies. The first in importance among his enemies were count Adolphus IV. of Holstein, and the citizens of Lübeck, who, during the military government of Waldemar, had prudently attracted to their town the commerce of the Baltic. Waldemar had now to learn that all power is transient which owes its existence merely to the military genius of a king, and is not the result of the well-directed activity of the community. The king was powerful, without having the means of preserving his power, and those industrious citizens, being possessed of such means, were formidable even before they knew it. In the battle of Bornhövd, a village not far from Eutin in Holstein, the Danish army was totally routed by the united forces of Lübeck, Holstein, and some neighbouring princes, and the king narrowly escaped death or captivity. He concluded peace in 1229, and was fortunate in escaping new humiliations. He renewed the war with Lübeck in 1234, but his navy was destroyed, and he was compelled to grant extensive privileges to the commerce of this town, which soon became known as the head of the Hanseatic confederation. Waldemar employed the rest of his life in the peaceful government of the remainder of his empire. During his reign the clergy and nobility rose to great influence, and the freemen gradually lost their political rights, which we may conclude from the circumstance that the antient 'things,' or 'dings,' that is, meetings of the whole community, were changed into 'herredage,' or 'lords' days,' that is, assemblies of the lords temporal and spiritual. Waldemar ordered the laws of Jütland to be collected: this is the 'Jydske Lov,' which is still in use in Jütland. It is contained in the great collections of the Danish laws, and there are also several separate editions of it. Waldemar II., sometimes called the Great, and with more justice than his father, died on the 28th of March, 1241. His first wife was Margaretha Dankmar, daughter of Przemisl Ottokar I., king of Bohemia. After her death he married Berengaria, daughter of Sancho I., king of Portugal. His eldest son Waldemar, who was married to Eleonora, daughter of Alphonso II., king of Portugal, died before his father, without leaving issue. He was duke of Sleswig, and is often called king Waldemar III., but he never reigned. The successor of Waldemar II. was his second son, Erik VI., Plogpenning.

(Holberg, Baron af, *Dannemark's Riges Historie*, vol. i., p. 270-300; Krantz, *Saxonia; Wandalia;* Mallet, *Histoire du Danemark.*)

WALDEMAR III. (IV.), surnamed Atterdag, was the son of king Christopher, who was deposed and banished in 1326. Waldemar was chosen king in his stead, but on account of his youth he was placed under the guardianship of Gerd or Gerhard, count of Holstein, of the house of Schauenburg, surnamed the Arbiter of the North. The Danes, having been oppressed by Gerd, recalled Christopher, in whose hands young Waldemar voluntarily placed his authority. Gerd forced the king to cede him half of his kingdom, and after the death of Christopher, in 1331, he again became guardian of Waldemar, and continued so for nine years. His pupil however was not in Denmark, but was educated at the court of Louis of Bavaria, emperor of Germany. After the murder of Gerd, in 1340, the Danes recalled Waldemar, who made his peace with the sons of Gerd, and sold the province of Scania to Magnus, king of Sweden. In 1347 he also sold Esthland, Kurland, and Livonia, which had been conquered by Waldemar II., to the grand-master of the Teutonic Order in Prussia, for 18,000 marks of silver. It seems however that it was not cowardice which led him to dispose of provinces which for the time he was unable to defend; for with the money he raised an army, and although he renounced Livonia and the sister-provinces, he attacked king Magnus of Sweden, in 1361, and forced him to cede Scania. He also conquered the island of Gothland, which remained a Danish province till 1645. He was less successful in two wars with the Hanseatic towns, and he did not obtain peace until he had given up almost the whole commerce of Denmark into the hands of those powerful citizens, who treated the king with great haughtiness. The treaty by which the second war was finished, in 1364, was particularly humiliating for the king: the treaty of peace begins:—'We, the burgomasters, aldermen, and citizens of the towns of Lübeck, &c., promise to grant an eternal peace to Waldemar, king of Denmark, the Wends, and Goths.' This is the first instance of the title of king of the Goths having been given to the king of Denmark, and it seems that Waldemar assumed it after the conquest of the island of Gothland. The title is still used in Denmark. In 1363 Waldemar gave his daughter Margaretha in marriage to Hagen or Hakon, the son and heir of Magnus, king of Norway. In 1369 he was again involved in war with the Hanseatic towns, and after the destruction of his navy, as well as his army, he begged for peace, in 1370, and ceded to these towns the province of Scania for fifteen years.

Waldemar III. died in 1373, the last of the first Danish dynasty, which had ruled in Denmark from the beginning of Danish history. He left two daughters: Ingeborg, married to Henry, duke of Mecklenburg; and Margaretha, married to Hakon of Norway, as already observed. After the death of Waldemar, one part of the Danes wished to chose Albrecht, duke of Mecklenburg, the son of Ingeborg, for their king, while another part voted for Olaus, the son of Margaretha. A civil war broke out, which however was soon terminated by an agreement that Olaus should be king. But on account of his youth, Olaus was put under the guardianship of his mother Margaretha, who afterwards succeeded in uniting the three Scandinavian kingdoms by the Union of Kalmar.

(Holberg, Baron af, *Dannemark's Riges Historie*, vol. i., p. 428-469; Krantz, *Saxonia;* Mallet, *Histoire du Danemark*.)

WALDEN, SAFFRON. [Essex.]

WALDENBURG. [Schönburg.]

WALDENSES. [Vaudois.]

WALDO, PETER. [Vaudois.]

WALDSTÄTTEN and WALDSTÄTTER SEE. [Luzern; Switzerland.]

WALES, a principality of Great Britain, lies on the west side of that island, between 51° 20′ and 53° 25′ N. lat. and 2° 41′ and 4° 56′ W. long. It is bounded on the west and north by St. George's Channel, on the east by the English counties of Chester, Salop, Hereford, and Monmouth, and on the south and south-east by the Bristol Channel. Its greatest length from north to south is about 180 miles, and its breadth from east to west varies from 50 to 80 miles. It contains 7425 square miles. In the third report of the Committee on Emigration, in 1829, the distribution of land was stated as follows:—

	Acres.
Cultivated	3,117,000
Uncultivated, capable of improvement	530,000
„ unprofitable . .	1,105,000
Total	4,752,000

The general physical features of Wales are given in detail in the article Great Britain.

History.—The origin of the names Wales and Welsh has been much questioned and discussed. Some writers make them a derivation from Gael or Gaul (which names are by the same authorities derived from Guethel and Gathel, all signifying Woodlanders). G and W at the beginning of words are often interchanged, and so far there is no difficulty in considering Gael and Wales as identical. On the other hand, some writers observe that Walsh in the northern languages of Europe signifies a stranger, and that the Britons, being unlike the Saxons and Angles in speech and customs, were therefore called Welsh, and their country Wales. Other antiquarians, adopting the same derivation, assign other reasons for the application of the term. The Saxon Chronicle speaks of the Wealas, Wylishe, or Welsh; and Taliesin, a Welsh bard of the sixth century, styles his own country Wallia. This is an argument against the supposition that the name was other than national.

The term Cambria, which is another and frequent name for Wales, is evidently derived from Cyumry or Cymri, one of the two great families into which the Celtæ appear to have been divided.

The history of the island of Great Britain previous to and during the period of the Roman domination is given in the article Britannia, and as there are no materials for a history of Wales during that period distinct from the narrative of events in the island generally, we shall refer to that article and to England, and proceed to give briefly the principal events connected with Wales from the time of the establishment of the Saxons, Angles, and other tribes in England, by which the antient inhabitants of the island were gradually driven to the west.

Down to the Roman conquest the Welsh, under a variety of princes, were engaged in almost constant warfare with the Saxons and Angles. During the sixth and seventh centuries, the country appears to have been divided into a number of petty kingdoms or principalities. As many as fourteen co-existing kingdoms are mentioned. 'The condition of the Cambro-Britons at this juncture calls,' says Sharon Turner, 'for our most compassionate anxiety. They had been driven out of their antient country; they had retired to those parts of the island by mountains, woods, marshes, and rivers secluded from the rest; yet in this retreat they lived with their hands against every man, and every man's hand against them. They were the common butt of enterprise to the Angles of Bernicia, and Deira and Mercia; to the Saxons of Wessex; and to the Gwiddelians of Ireland: and they were always as eager to assail as to defend. The wild prophecies of enthusiasts, who mistook hope for inspiration, having promised to them in no long period the enjoyment of the soil from which they had been exiled, produced in them a perpetual appetite for war.'

In the commencement of the seventh century, Ethelfrith, king of Bernicia, and the grandson of Ida, attacked the Welsh, assembled under Brochmael, king of Powys, gained a decisive victory, and put 1200 priests to death, who had assembled to offer their prayers for the success of their countrymen. About the same time Ceolwalph, from Wessex, penetrated into the province of Glamorgan; but the inhabitants, under Tewdric, their former king, drove the invaders across the Severn. Edwin, sovereign of Deira and Bernicia, subdued Anglesey and a considerable part of North Wales, and drove Cadwallon, the sovereign of North Wales, and whose father had been the protector of Edwin in early life, into Ireland. Cadwallon defeated and slew Edwin in 633, and penetrated into and desolated Northumbria. Successful in fourteen great battles and sixty skirmishes, Cadwallon was regarded by the Cyumry or Welsh as the deliverer of their country. He was however slain, with the flower of his army, in an engagement with Oswald of Northumbria.

Ethelbald, king of Mercia, endeavoured in the early part of the eighth century to annex the region lying between the Severn and the Wye to his territories, and with that view entered Wales with a powerful army, but the Welsh, in a battle fought near Abergavenny, checked his progress. Ethelbald however, uniting with the king of Wessex, overpowered them. Dissensions between Mercia and Wessex soon followed, which led to a successful confederation between Roderic Molwynoc, the Welsh leader, and Cuthred king of Wessex, against the king of Mercia, whom they defeated in battle at Hereford. The alliance was of short duration, and Cuthred in turn took up arms against and defeated the Welsh, and in 753 Roderic Molwynoc abandoned the south-western district of Wales and withdrew into North Wales. Towards the end of the eighth century the Mercians succeeded in driving the Welsh from the border territory, and Offa, king of Mercia, made an artificial boundary from the mouth of the river Dee on the north to the river Wye on the south, known by the name of Clawdd Offa, or Offa's Dyke, traces of which are still to be found along a great part of the line. With this exception, no permanent footing was gained in Wales, although Egbert, king of Wessex, gained some important victories in 828, and penetrated as far as Snowdon; but the incursions of the Danes, by calling away the Saxons, left the country for some time in tranquillity. Roderic, who had acquired the sovereignty of nearly all Wales, in 843 divided his dominions into three principalities, to which his three sons succeeded. One of these principalities was called by the Welsh, Gwynedd, and corresponded nearly to the present North Wales; another, Ceredigion and Dyved, or South Wales; and the third Powys, comprising parts of Montgomeryshire, Shropshire, and Radnorshire.

Other smaller tracts were occupied by various princes, who, suffering from the attacks of Roderic's sons, sought and obtained the protection of Alfred, king of England, and Anarawd, one of the three sons of Roderic before mentioned, subsequently did the same, and became subject to the Saxon king. In 877 Merfyn (another of the sons of Roderic) being deposed by his brother Cadell, the dynasties of Powys and South Wales were united under the latter prince, at whose death, in 907, his son Howel Dda succeeded to the sovereignty. Anarawd survived his brother Cadell only six years, and was succeeded by his son Edward the

Bald; but this prince was slain in an engagement between the English and the Danes. In this way the three subdivisions of Wales became reunited under the sceptre of one king, Howel, who was surnamed Dda, the Good. He appears to have been an excellent king, and he reformed and digested the laws of his country. At a subsequent period Wales was divided into two principalities, North and South Wales, but the former seems to have had some predominance over the latter. During all these changes however some districts appear to have had their separate petty princes.

The Danes, in 875, appear to have ravaged a great part of South Wales.

In the tenth century a fine or annual tribute of money was imposed on the Welsh, by Athelstan, king of England, who had obtained the nominal dominion of Wales. This payment was subsequently changed by Edgar into an annual tribute of three hundred heads of wolves, which then infested the country. As the wolves were extirpated, which is stated to have been the case within three or four years from the imposition of this tribute, the payment in money was resumed. On the occasion of a visit by Edgar to Chester, Macchus of Anglesey and the Isles, and three petty Welsh kings did homage. This Macchus, or Hiring, was son of the king of Denmark, and having been sent by his father to England, had conquered Anglesey.

On the accession of William the Conqueror, the Welsh refused to pay tribute. The Norman conqueror invaded their country with a considerable army, reduced them to submission, and compelled their princes to do homage and take an oath of allegiance as his vassals, and from this period the English kings preferred a claim to Wales as their dominion. On the accession of William Rufus, the Welsh, uniting with some discontented English barons, committed devastations and outrages on the English border. At the same time Eineon, Jestyn ap Gwrgaint, and other chieftains of South Wales rose in rebellion against Rhys ap Tudor, their king, and with the assistance of Robert Fitzhamon, and a body of Normans, defeated their prince. Jestyn refusing however to fulfil a promise he had made to Eineon, namely, to give the latter his daughter in marriage, the Normans assisted Eineon in wresting from Jestyn the territory of Morganwg, the principal part of which Fitzhamon retained for himself and his knights, leaving only the barren mountains for Eineon. In this manner, and by grants from William the Conqueror and his son to their Norman dependents of all lands they might acquire possession of in Wales, originated the Lords Marchers. 'Among the foremost was Bernard de Newmarche, with a train of followers, who subdued and took possession of Brecknockshire. Roger de Montgomery did William the First homage for Cardigan; as did also Arnulph, his youngest son, for the great lordship of Pembroke. Nor were the northern parts of the country long secure from the encroaching spirit of the times. The Earl of Shrewsbury, having paid homage for Powys-land, proceeded to subdue that region; Hugh Lupus, earl of Chester, did the same for Englefield and Rhyvonioc; Ralph Mortimer, for the district of Elvel; Hugh de Lacie, for the lands of Euas and Eustace; and Omer, for Inold and Hopedale. In the year 1102 Henry I. bestowed several other lordships and castles in Wales on Englishmen and Normans; and for the purpose of still further breaking the high spirit of the Cambrians, he introduced, in the year 1108, into Pembrokeshire, a numerous colony of Flemings.' (Rev. J. Evans.) The principality of South Wales was for a time destroyed; Powys-land was also possessed by the English; and North Wales alone retained its independence.

In 1237, Gryffyth, the eldest son of Llewellyn ap Jorweth, prince of North Wales, rebelling against his father, that prince applied for the protection of Henry III. of England, which he received upon the disgraceful terms of yielding vassalage to the English crown. David, the eldest son of Llewellyn, on the death of his father, renewed the homage to England, and taking his brother Gryffyth prisoner, delivered him to Henry, who imprisoned him in the Tower, where he lost his life in an attempt to regain his freedom. After the death of Gryffyth, Henry gave the principality of Wales to his eldest son Edward, afterwards Edward I. David now sought the aid of the pope, offering as an inducement that the sovereignty of Wales should in future be held under the church of Rome. The pope absolved David from his oath of allegiance to Henry, and his commissioners cited the English king to appear before them to answer to the charge of David. Henry, it is said, quieted the pope with large sums of money. Llewellyn, the youngest son of Gryffyth, succeeded to the throne of North Wales on the death of his uncle David, and his brother Owen Goch to that of South Wales, and was obliged to renew the homage, which was now claimed by England as an established right. He however entered into a confederacy with Simon de Montfort, earl of Leicester, and invading England with an army of 30,000 men, ravaged the lands of Roger de Mortimer and all the neighbouring barons adhering to Henry. Prince Edward repulsed him and forced him back into the mountains of North Wales. Llewellyn contrived notwithstanding to give his support to the enemies of Henry, but when that king was at last securely seated on his throne, peace was established between the two countries. After the accession of Edward I. to the English throne, the Welsh prince was summoned to do homage, which he declined doing without having hostages for his safe conduct, and demanded that his consort, who was Edward's prisoner, should be restored. This Edward refused to comply with, and immediately proceeded to levy war against him, assisted by David and Roderic, brothers of Llewellyn, who had dispossessed them of their inheritance. The Welsh prince defended himself among the inaccessible mountains of Carnarvonshire, but Edward blocked up Llewellyn and his army so effectually, that after sustaining all the horrors of a siege, they were obliged to yield to the wary English king. The terms imposed by Edward were—a payment of 50,000*l.*; Llewellyn and the Welsh barons to do homage and swear fealty to the English crown; to surrender a portion of their territory; to make pecuniary compensation to Llewellyn's brothers and to deliver hostages for future obedience. The English however, rendered insolent by this victory, harassed and oppressed the inhabitants of the border; severer terms were imposed on Llewellyn, followed by other insults and indignities. The brave mountaineers once more determined to give battle to their oppressors. In this campaign Llewellyn was joined by his brother David, but Llewellyn was slain in or immediately after an engagement with the earl of Mortimer, near Builth in Breconshire. This happened in 1284. David, who succeeded him in the principality, was soon after executed at Shrewsbury as a traitor for defending by arms the liberties of his native country and his own hereditary authority. As an appropriate sequel, a massacre of the Welsh bards by Edward's orders soon followed. The nobility of Wales submitted to the conqueror, and by the statute of Rothelan, passed in the 12th year of Edward's reign, Wales was incorporated and united with England.

Thus ended the existence of the Welsh as an independent nation, after having retained their freedom from foreign yoke for nine hundred years longer than the rest of England. The title of Prince of Wales was bestowed by Edward upon his son, afterwards Edward II., and has ever since been the title conferred on the king of England's eldest son. [WALES, PRINCE OF.]

In 1295 insurrections broke out in various parts of Wales. 'The inhabitants of West Wales took up arms under their leader Maelgwyn Vychan, and carried devastation over the counties of Pembroke and Cardigan. The southern parts revolted under the command of Morgan, a descendant of the lords of Morganwg; and Madoc, an illegitimate son of Llewellyn, was at the head of the insurgents of North Wales. Their proceedings, although conducted without any common principle or purpose, became so formidable as to require the presence of Edward in person to reduce them to submission. A subsequent revolt by Sir Gryffyd Lloyd was put down. Edward built castles at Rhuddlan, Conway, Beaumaris, Carnarvon, Harlech, and Aberystwith. These castles were erected in those counties which Edward had really subdued, and in which alone the statute of Rothelan could be immediately enforced. The last effort by the Welsh to maintain an independent existence was under Owen Glendwr [GLENDWR, OWEN], in the commencement of the fifteenth century. His career and brilliant success in opposing the English army are intimately connected with English history.

The Welsh for many ages kept up a strong feeling of hatred for the English, which some of the English statutes relating to the Welsh were little calculated to remove, but which time and the subsequent assimilation of the laws of the country to those of England ameliorated; so that it may be said at last to have worn itself down to mere prejudice and a little national feeling of jealousy on both sides, which still exists. It was a considerable time however before the Welsh were put on the same footing with English subjects. Severe laws were passed in the reigns of the fourth and sixth Henries, the former containing provisions directed against the bards, who kept up the national feeling of discontent by songs of former glory and narratives of English wrongs; but in spite of the attempts to suppress them, the bards continued to flourish. Other provisions of the same statute enacted that no Welshmen should hold any offices in Wales, except they happened to be bishops; that they should not have any castle, fortress, or house of defence; and even marrying a Welsh woman equally incapacitated an Englishman. By a statute of Henry VIII. (26 Hen. VIII., c. 6) no person in Wales or the Marches was allowed to carry without licence to any sessions or court there, or within two miles of the same, or to any town, church, fair, market, or congregation, any 'bill, low-bow, cross-bow, hand-gun, sword, staff, dagger, halbert, morespike, spear, or any other weapon, privy coat or armour;' and by the same statute games of running, wrestling, leaping, and all other games, 'the game of shooting only excepted,' were prohibited on pain of a year's imprisonment and fine. By a statute however passed in a subsequent period of the same reign it was declared that persons born in Wales should enjoy all the liberties of English subjects; but a clause in the same statute declared that no one using the Welsh language should have or enjoy any office or fees in any of the king's dominions, but should forfeit them unless he used English; and it appears that the provisions of the 26th of Henry VIII. were revived by a later statute. The proceedings in all law and other courts were also directed to be conducted in the English language.

By the statute of Rothelan (12 Edward I., c. 5) a part of Wales was formed into the counties of Anglesey, Carnarvon, Merioneth, and Flint; and by a statute passed in the 27th year of the reign of Henry VIII., various lordships in the Marches were united to English or Welsh counties, and the remainder were divided into new counties, viz. Monmouth, Brecknock, Radnor, Montgomery, and Denbigh; and by this statute one knight was directed to be chosen for each county in Wales, and a burgess for every borough being a county town, except the county town of Merioneth, and a member was subsequently given to Haverfordwest. By the 2 Wm. IV., c. 45 (Reform Act), an additional member was given to the counties of Carmarthen, Denbigh, and Glamorgan; a member was given to Merthyr Tydvil, and one to Swansea, and numerous places were made contributory boroughs to each of the antient boroughs returning members.

Constitution, Government, Laws, and Customs.—The laws and chief features of the constitution of the Britons when masters of the whole island seem to have been preserved in Wales for a considerable time; many of them indeed remained in full force until their abolition or alteration by express statutes at a comparatively recent period. The government from the earliest period appears to have been monarchical, but not following a strict rule of descent. The successor was nominated in many instances by the reigning king; and although generally selected from the royal family, was not necessarily the next heir. An old code of laws compiled from those of Howel Dda states that no one is an 'edling' (a heir to the throne) 'except that person to whom the king shall give hope of succession and designation.' No power but the regal could either enact or abrogate a law. Traces of a popular representation are to be found in the formation of a digest of the Welsh laws by Howel dda, in the tenth century. For this purpose six of the most intelligent and powerful persons were summoned out of every cymwd, or hundred, and also the nobles, bishops, and principal clergy, to assist that king in the great work of legislation. By these means the antient laws were revised, others enacted, and all digested into one regular code, and a declaration made that they should not be altered, except by means of a similar national council. There does not appear however to have been any precedent for this mode of proceeding by Howel Dda, nor does it seem to have been subsequently adopted in the formation or alteration of the Welsh laws by Bleddyn, prince of North Wales in the 11th century, and others. On the contrary, all the witnesses examined by the commissioners appointed by Edward I. to inquire into the laws and customs existing in Wales, agreed that the princes of Wales could alter the laws at their pleasure; nor do they make the least mention of a parliament or even a council. (Barrington's *Observations on the Statutes*.) The laws of Howel Dda, at first enforced throughout the whole of Wales, were afterwards, on account of local customs, formed into three independent codes, having force respectively in Venedotia or North Wales, Dimetia or South Wales, and Gwent or South-east Wales. 'Immediately below the sovereign ranked the *Uchelwyr* or great men, holding their lands from the crown, each presiding as lord over his particular domain. immediate tenants of the king, they were obliged perform certain services. Some held their lands by tenure of personal attendance on the king's court, the majority retained their estates by the *gwaeth milwyr* or military service, being bound on summons to attend their sovereign with a certain number of men in arms, and follow him to the war; to aid in the repair of the royal castles; and were also assessed with certain stated rents, payable in money or kind.' (*Rev. J. Evans.*) Under this reserve of tribute the lands were inheritable by the family.

The great body of the people were composed of two classes, both holding under and subject to the *Uchelwyr*: those of the first class holding their lands at discretion, and possessing the power of buying and selling, and whose seignorial service was the least degrading of the menial kind. Those of the other class, denominated *Caeths*, were considered the property of the lord, attached to the soil and saleable with the estate. Both were subject, like the chiefs, to military attendance in time of war, and to contribution in money or kind. Lands descended to all sons equally; the youngest son divided them, and the portions were then chosen according to seniority. The king was the ultimate heir, and took all lands where the owner left no heir of his body or co-heir as near as a third cousin.' Illegitimate offspring inherited, but legitimate of the same degree of consanguinity had the preference; subject however to this strange law, that if an owner of land had an heir without bodily blemish, and another who was blemished (such as one blind, or deaf, or crippled), the unblemished was to be heir to the whole land, whether he was legitimate or illegitimate; and the reason assigned was, that no one who was blemished could accomplish the service of the soil due to the king in the court and in the army. Females were excluded until all the males were extinct. This law continued in force until the reign of Henry VIII., as regarded the equal right of sons, but the exclusion of females was abolished and the exclusion of illegitimate offspring enforced by Edward I., in the statute of Rothelan before referred to. By the statute 27 Henry VIII., c. 26, it was enacted that land in Wales should descend according to the English laws, and that the laws and statutes of the realm, and none other, should be there executed. This declaration was repeated in subsequent statutes in the same reign, and power given to persons to alien lands in Wales from them and their heirs to any person in fee simple, fee tail, for life or years, according to the laws of England, notwithstanding any Welsh law or custom to the contrary. The statute 34 and 35 Hen. VIII. continued the court of the president and council of Wales and the Marches, which had originated with the possession of the border districts by English noblemen, and been re-established by Edward IV., and seems to have exercised an equitable and undefined jurisdiction. Regulations for the administration of justice in North Wales had been effected by Edward I., and by the last-mentioned statute of Henry VIII. Justices were appointed to hold sessions, to be called the king's sessions, twice every year in all the counties of Wales, which was divided for that purpose into four districts of three counties each. These justices had power equal to the English judges in all actions, real, personal, and mixed, and for the trial of all criminal offences. They also had an equitable jurisdiction, and held courts of chancery on the circuits. The precise origin of this branch of their power seems obscure. The statute of Henry did not confer the power in precise terms, but it probably did in effect by the clause giving the custody of the seal for the counties to the chamberlain or award of the circuit, who constituted a part of the court. It is also been suggested that the abolition of the court of e president and council of the Marches, which was effected the reign of William and Mary, threw a considerable rtion of their equitable jurisdiction into the courts of great ssions. Most of the pleadings at common law were drawn id filed during the continuance of the sessions at one town he statute of Henry directing that six courts, on as any days, should be held in each county), and it very fre- iently happened that a cause was carried on from its com- encement to the close during those six days. Eight days' otice of action was however required to be given to a efendant. From the common law side, an appeal lay to ie Court of Queen's Bench; and from the equity side, to ie House of Lords. After the appointment of a second istice for each circuit, by a statute of Elizabeth, all the ials took place before the two judges, in the same man- er as a trial at bar in England. Parties had the power owever, in most actions, of so framing the record, as to nable them to try the causes at the assizes in the nearest nglish county—a power which was frequently exercised. he judges of these courts of great sessions were gene- ally barristers, practising in England, their official station nly lasting during the circuit. These courts were only ecently abolished (1830) by the 11 Geo. IV. and 1 Wm. V., c. 70, and Wales divided into two circuits, North and outh Wales.

The number of justices of the peace in each county was estricted by the 34 and 35 of Henry VIII. to eight, in ad- lition to the president, council, and justices of the Lord Pre- ident's Court; but this clause was repealed in the reign of William and Mary.

The practice of the sheriffs' courts for pleas under forty shillings was by the 34th and 35th of Henry VIII. assimilated to that of England, and trials in these courts were to be decided by wager of law, or verdict of six men, at the election of the plaintiff or defendant.

A variety of other enactments respecting the administration of justice are to be met with in the statutes of Henry VIII., above referred to, most of them corresponding with the English laws of that period.

Antiquities.—Wales abounds in memorials of its past history. The cromlechs, and carnedds, and barrows [TUMULUS], relics of the Druids [BRITANNIA] and bards; camps, British and Roman; abbeys and castles of later periods; are all to be met with in various parts of the principality. Detailed notices of these will be found in this work in articles treating of each county.

For a notice of Welsh literature and language, see the articles GREAT BRITAIN, BARD, and WELSH LANGUAGE AND LITERATURE.

Divisions, Population, Occupations, &c.—Wales is divided into North and South Wales, each containing six counties. The following table gives their names, population in 1841, area, and number of parishes:—

	Population in 1841.	Area in Square Miles.	No. of Parishes.
NORTH WALES.			
Anglesey . . .	50,890	271	67
Caernarvonshire .	81,068	544	71
Denbighshire . .	89,291	633	59
Flintshire . . .	66,547	244	27
Merionethshire .	39,238	663	34
Montgomeryshire .	69,220	839	54
SOUTH WALES.			
Brecknockshire .	53,295	754	67
Cardiganshire . .	68,380	675	65
Caermarthenshire .	106,482	974	76
Glamorganshire .	173,462	792	127
Pembrokeshire .	88,262	610	145
Radnorshire . .	25,186	426	52
Total .	911,321	7425	844

Since the passing of the 11 Geo. IV. and 1 Wm. IV., c. 70, Wales has no jurisdiction in legal matters distinct from England. It is divided into two circuits—North and South Wales, and one judge travels each.

It contains four bishoprics—those of Bangor and St. Asaph in North Wales, and of St. David's and Llandaff in South Wales. The boundaries however of the Welsh and English bishoprics adjoining are not determined by any reference to the boundaries of the principality, any more than they are by the divisions of counties.

Many details respecting the amount and employment of the population of Wales are given in the article GREAT BRITAIN; but the census of 1841 affords data and materials for some further particulars.

The population in 1841 was—males, 447,533; females, 463,788; total, 911,321. The total population in 1831 was 806,182, showing an increase in the ten years of 105,139, or 13 per cent., being 1·5 per cent. less than the rate of increase in England during the same period. The average number of inhabitants to every square mile in 1841 was a fraction less than 123, while the returns for England in the same year give a population of nearly 300 to every square mile. The number of inhabited houses in 1841 was 188,196; uninhabited, 10,133; building, 1769.

The inhabitants are chiefly engaged in agriculture, as will be seen by the following enumeration, taken from the returns of 1831, the returns of 1841 in these particulars not having yet been published. Number of families employed in agricultural pursuits, 73,195; employed in trade, manufactures, &c., 44,702; all other families, 48,641. The centesimal proportions therefore were—agriculture, 43·9; trade, manufactures, &c., 26·9; all others, 29·2: total, 100.

The farms are generally speaking small, and more than one half of them are cultivated by the occupiers without the assistance of labourers. The returns of 1831 gave the number of occupiers engaged in agriculture and employing labourers at 19,728, and those not employing labourers at 19,966. A considerable number of the latter are either owners as well as occupiers of the small portion of soil they cultivate, or hold it from the lord of the manor at a nominal or reduced rent.

The principal manufacture in Wales is that of iron, and this is chiefly confined to Glamorganshire. Immense quantities of ore are raised in that county, where the most extensive smelting-furnaces in the empire are to be met with. In the year 1830 the quantity of iron made in South Wales was estimated at 277,000 tons, nearly equal to the whole quantity produced in Staffordshire and the rest of England. The iron is shipped at Newport, Swansea, Llanelly, and other ports on the Glamorganshire and Monmouthshire coasts; and the latter county, as forming part of the South Wales coal-basin and mining-districts, must be included in the estimates of the amount of iron and coal produced.

Copper-ore, brought from Cornwall and other parts of England, from Ireland, and foreign countries, is smelted in large quantities at Swansea. The total quantity of ore smelted there in the year ending June, 1840, was 56,285 tons.

The great coal-field of South Wales affords employment to a number of hands. The quantity of coal and culm exported at the different ports of South Wales and Monmouthshire, in 1839, was 1,376,217 tons, and in 1840, 1,438,276 tons. North Wales also yields some coal and iron, from the vicinities of Wrexham and Ruabon in Denbighshire. Lead (with some silver-ore) and copper are raised in Anglesey, Cardiganshire, and other parts of Wales, as well as large quantities of slate, limestone, and marble. Various manufactures in lead, iron, copper, and brass are carried on at Holywell in Flintshire. Flannel, coarse cloth, and stockings are manufactured in Montgomeryshire and other parts of North Wales, the first-mentioned article in considerable quantities, but the trade in all of them has decreased considerably of late years. The shipping, &c. at Pembroke, Milford, Swansea, Caernarvon, Bangor, Port Madoc, and other ports also afford employment to many persons. The number of persons engaged in manufacture and in making machinery, in 1831, was 6218; and the number of labourers employed in labour not agricultural, 31,571. The latter class comprises those occupied in raising iron-ore and coal, and labour connected with them, and the other sources of employment just enumerated.

Education.—To say that the state of the people in regard to education is very low, is only to state a defect common to England and Wales; but the latter country is even less advanced than the former. There are a great number of Sunday-schools in connection with the Church and dissenters, and these form at once the commencement and end of the education of a great portion of the community. These Sunday-schools are almost all supported by subscription, without endowment or payment by the scholars. A table of the various classes of schools and the number of scholars will be found in the article Great Britain, taken from the returns laid before parliament in 1834. The number of marriages in the Welsh division of the Registrar-General (which includes Monmouthshire), in the year ending June 30, 1841, was 7565. Of this number 3530 men and 5171 women signed the marriage register with marks. The mean proportion per cent. of persons married in Wales, in the three years ending June 30, 1841, who signed with marks—or in other words, those unable to write—was, 47·6 men, and 69·0 women; while the mean centesimal proportion in England and Wales of persons marrying in the same years, who signed with marks, was 33·28 men and 49·29 women. This is a very safe, fair, and simple test of the state of education. 'The parties are neither asked whether they can write or read, nor formally requested to write; but sign the marriage registers with their name or their mark in attesting the marriage. The parties who marry are on an average about 25 years of age; so the test shows the state of education ten or twenty years ago, and the subsequent inducements to the retaining of the information and skill then acquired.' (*Fourth Report of the Registrar-General.*)

Religion.—Dissenters of various creeds abound in Wales. The Independents or Congregationalists are probably the most numerous. Particular or Calvinistic Baptists, and Primitive, Wesleyan, and Welsh Calvinistic Methodists compose the remainder of the great body of dissenters in Wales. The number of buildings registered in Wales for the solemnization of marriages, up to the 30th of June, 1842, was 192; but this is not a safe guide in estimating the proportion of dissenters, as many of the latter (the Methodists especially) have not as yet availed themselves of the late act; and in one county in Wales, where the dissenters certainly form the majority of inhabitants, there is not one building registered for marriages.

Pauperism.—The number of paupers receiving relief in Wales (with the exception of a small portion not then placed under the provisions of the Poor Law Amendment Act), at Lady-day, 1839, was 68,524; and at Lady-day, 1840, 73,254. The proportion of paupers at the last-named period to the population, taken from the returns of 1831 (and excluding the population of the parts not under the operation of the act) was 9·4 per cent. In England the proportion of paupers at the same period to the population was 8·6. These figures somewhat exceed the actual proportion, as no allowance is made for the increase of population between 1831 and 1840. The expenditure for the relief of the poor (exclusive of incidental charges and expenses), in 1831, was 289,422*l*., and in 1841, 266,000*l*. These respective sums, if equally apportioned among the whole population according to the census of each of those years, would amount in the first-named year (1831) to 7*s*. 2*d*., and in the last year (1841) to 5*s*. 10*d*. per head. In England the rate of expenditure per head in 1831 was 9*s*. 11*d*., and in 1841, 6*s*. The result shows that, while the proportion of persons receiving relief in Wales is somewhat greater than in England, the proportionate expenditure is less in the former country than in the latter, and that in Wales, as well as in England, the Poor Law Amendment Act has beneficially affected the ratepayers.

Crime.—The number of persons charged and convicted in Wales for offences have been as follows:—

Year.	Convicted.	Acquitted.	Total.
1834	283	159	442
1837	292	186	478
1840	414	236	650

Of those charged in 1840 there were, for offences against the person, 66; against property with violence, 45; against property without violence, 462; malicious offences against property, 2; forgery and offences against the currency, 22; other offences, 53: total 650. Of this number 141 were females. Of the total number 45 could read and write well.

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